

the teacher helps to modify the methods of instruction and to prescribe remedial works. Formative evaluation answers to the questions—

- Are the pupils actually benefited by the instruction ?
- Whether the desired change in behaviour being produced in pupils ?
- To what extent the pupils have achieved the objectives of instruction ?
- Whether the progress of the pupils in a unit is successful ?

Formative evaluation determines learning success of the learners and identifies learning errors of the pupils which need to be corrected. Formative evaluation requires specially prepared tests for each unit of course or each chapter of a text book. Generally teacher made tests are used for formative evaluation, but published tests can also serve this function. Observational techniques can also be used for the purpose. The results of the formative evaluation can only be used to improve learning and instruction but it cannot be used for assessing course grades.

**DIAGNOSTIC EVALUATION** : Diagnostic evaluation is used when corrective measures prescribed on the basis of formative evaluation fails to solve the problems. The purpose of diagnostic evaluation is to solve the chronic or recurring learning difficulties. In this case highly specialized procedures are used to get the data. When formative evaluation acts as an first aid treatment at that time diagnostic evaluation is an intensive treatment to cure the disease. For example a particular student is weak in mathematics. If he continues to experience failure despite the use of prescribed alternate methods of instruction like use of audio-visual-aids, programmed materials, specialized methods etc then a detailed diagnosis is necessary. Thus diagnostic evaluation is more comprehensive and detail than that of the formative evaluation. In order to diagnose the learning difficulties it uses specially designed diagnostic tests and various observational techniques. When the learning difficulties are acute in that case services of psycho therapists, psychological tests and physiologists are required. The main objective of this evaluation is to determine the causes of the persistent learning problems that remain unsolved by the formative evaluation and to prepare a plan of action for their remedy.

**SUMMATIVE EVALUATION** : Summative evaluation is used to determine, how far the instructional objectives have been achieved. It obviously comes at the end of course. The main objective of the summative evaluation is to assign grades to the pupils. It indicates the degree to which the students have mastered the course content. Therefore the summative evaluation is terminal in nature. It helps to judge the appropriateness of the instructional objectives. It also helps the teacher to know the effectiveness of the instructional procedure. Summative evaluation result helps in the selection of instructional objectives and effective methods of teaching.



The techniques of summative evaluation are decided according to the instructional objectives to be measured. It may be teacher made achievement tests, rating scales and evaluation of some product like a drawing, painting, essay or research report.

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**Difference between Formative and Summative Evaluation :**

Michael Serinen for the first time used the terms formative evaluation and summative evaluation in 1967. The difference between both the terms can be summarised under following headings.

Formative Evaluation	Summative Evaluation
1. Formative evaluation is used during the teaching learning process to monitor the learning process.	1. Summative evaluation is used after the course completion to assign the grades.
2. Formative evaluation is developmental in nature. The aim of this evaluation is to improve student's learning and teacher's teaching.	2. Summative evaluation is terminal in nature. Its purpose is to evaluate student's achievement.
3. Generally teacher made tests are used for the purpose.	3. Generally standardized tests are used for the purpose.
4. The test items are prepared from limited content area.	4. The test items are prepared from whole content area.
5. It helps to know to what extent the instructional objectives has been achieved.	5. It helps to judge the appropriateness of the instructional objectives.
6. It provides feed-back to the teacher to modify the methods and to prescribe remedial works.	6. It helps the teacher to know the effectiveness of the instructional procedure.
7. Only few skills can be tested in this evaluation.	7. Large number of skills can be tested in this evaluation.
Formative Evaluation	Summative Evaluation
8. It is a continuous and regular process.	8. It is not regular and continuous process.
9. It considers evaluation as a process.	9. It considers evaluation as a product.
10. It answers to the question, whether the progress of the pupils in a unit is successful ?	10. It answers to the question, the degree to which the students have mastered the course content.

**Classification According to the Nature of Measurement :** Cronback in his book 'Essentials of Psychological Testing' has categorised measurement into two broad headings namely 'Maximum Performance' and 'Typical Performance'.



**Minimum Performance :** This type of measurement indicates how well an individual performs when he makes his best effort. It indicates what is the optimum capacity of an individual or what an individual can do. Aptitude tests and Achievement tests comes under this category.

**Typical Performance :** Instead of indicating how well an individual performs, this type of measurement reflects what the individual will do. It is specially designed to measure the typical behaviour of the individual. Procedures involved in measuring interests, adjustment, attitudes and various personality traits comes under this category.

**Classification According to the Interpretation of Results :** Measurement and evaluation procedures can be classified as per the interpretation of the results. In this way we can classify the interpretation into two types.

**Norm-Referenced Measurement :** When the interpretation is made in terms of the "relative position held in some known group." A norm referenced measurement is designed to measure the performance of an individual, which is interpretable in terms of the individual's relative position in some known group.

The group taken for comparison may be local, state or a national level group. In norm-reference interpretation, for example we have administered an achievement test in class-X. And we found that Mona's position is 10th in a 50 member group. So she has performed better than 80 percent of the group members.

**Criterion-Referenced Measurement :** When the interpretation is made in term of the 'specific performance' that an individual has demonstrated. For example Mamun has spelled 5 words correctly out of 10.

Criterion-reference interpretation can be made in different ways. Firstly we can describe the specific learning tasks a student is able to perform *i.e. he can spell 20 words correctly*. Secondly we can indicate the percentage of tasks a student performs correctly *i.e. he can spell 70 percent of words correctly*. Thirdly we can compare the performance of an individual on a test with some standard set of performance.

### **Some Basic Terminology Used in this Chapter.**

**Test :** Test is a set of questions or task to which a student has to respond. It is designed to describe the quantitative representation of a particular trait.

**Measurement :** Measurement is the process by which numerical description of the degree to which an individual possesses a particular characteristic can be obtained.



**Evaluation :** Evaluation is the process of ascertaining or judging the value or amount of something. Describe to which extent pupils have achieved instructional objectives.

**Norm-Referenced Test :** When a test result is interpreted in terms of an individual's relative position in some known group it is called norm-referenced test.

**Criterion-Referenced Test :** When a test result is interpreted in terms of an individual's performance in relation to some clearly defined domain of learning task.

## MODEL QUESTIONS

1. What is measurement ? Discuss how it is related to evaluation?
2. What is educational evaluation ? How does it differ from educational measurement ? Discuss its importance in a school?
3. What is meant by evaluation ? Discuss briefly any two of its needs in the educational process ?
4. What are different types of evaluation ? Discuss each type in detail?
5. Differentiate between?
  - (i) Formative evaluation and diagnostic evaluation
  - (ii) Norm-referenced and criterion-referenced measurement.
- 6 Explain with examples any two functions of educational measurement?

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## Chapter 2

# Instructional Objectives

- ▶▶ *Methods of Selecting Instructional Objectives*
- ▶▶ *Preparing a List of Learning outcomes*
- ▶▶ *Preparing Taxonomy of Instructional Objectives*
  - Cognitive domain
  - Affective domain
  - Psychomotor domain.
- ▶▶ *Preparing List of Instructional Objectives from Other Sources.*
- ▶▶ *Principles of Selecting Instructional Objectives.*
- ▶▶ *Methods of Stating Instructional Objectives.*

The purpose of instructional process is to promote a well-integrated development of a person. Therefore we must be clear what type of learning outcomes we expect from our teaching—knowledge, understanding, application or performance skills? The first step of an effective teaching is to clearly define the designed learning outcomes. It also helps to develop a good evaluation procedure.

Instructional objectives play a pivotal role in the teaching learning process. The main purpose of instructional objectives are

- to provide direction for the instructional process by clearly stating the intended learning outcomes.
- to convey instructional intent to pupils, parents and educational organisations.
- to provide a basis for evaluating pupil learning by describing the performance to be measured.

Thus a clearly stated instructional objectives make the methods and



materials of teaching more effective. It also helps to know what the pupils should learn and how the learning is to be expressed. In the previous chapter we have discussed that an effective evaluation depends on a clear description about what is to be evaluated. So before selecting or developing any evaluation measure we should specify the intended learning outcomes. So that the instructional objectives must be well stated.

## **METHODS OF SELECTING INSTRUCTIONAL OBJECTIVES :**

In a course or unit there can be hundreds of learning out-comes. It must be considered which learning outcomes are most valuable for a given course or unit. So that the intended learning outcomes must be selected before in order to reduce the confusion and to ensure that important learning outcomes are not over-looked. Some of the important methods of selecting instructional objectives are as following :

### **A. Preparing a list of types of learning outcomes to be considered.**

Learning outcomes resulting from a course or unit can be classified into some headings. It helps in many ways. Firstly it indicates the learning outcomes to be considered. Secondly it provides a framework for classifying the objectives. Thirdly it indicates the changes in pupil performance in different areas.

An example of classifying and listing the instructional objectives is given below :

#### **1. Knowledge**

- Common terms
- Specific facts
- Basic concepts
- Methods & procedures
- Principles.

#### **2. Understanding**

- Facts and principles
- Verbal materials
- Charts and graphs
- Numerical data.



- Methods and procedures
- Problem situations.

### 3. Application :

- Principles
- Theories
- Problem solving skills
- Construction of graphs and charts.

Like this a vast list of learning objectives can be prepared for a particular course or unit. It is not possible on the part of a teacher to identify all objectives in all areas. Therefore the teacher has to determine the instructional, objectives and expected learning outcomes taking into account pupils, abilities subject matter and demand of the society.

## B. Preparing the Taxonomy of Instructional Objectives

An widely used method of classifying instructional objectives is the 'Taxonomy of Educational Objectives'. It was first prepared by a group of college and university examiners in the cognitive domain. This was reported in 'Taxonomy of Educational Objectives (1956) edited by Benjamin S. Bloom. An attempt was made to identify and classify all possible educational outcomes. In this system the objectives are divided into three major areas.

- (a) Cognitive Domain
- (b) Affective Domain
- (c) Psychomotor Domain

### COGNITIVE DOMAIN :

Cognitive domain is concerned with knowledge outcomes, intellectual abilities and skills, it includes activities such as remembering and recalling, thinking, problem-solving, creativity etc. The major categories in the cognitive domain are Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation. Bloom has presented them in a hierarchial order of intellectual ability. These classes can also be classified into further sub-classes under the heading of 'General Instructional Objectives' and Illustrative verbs for stating specific learning outcomes.

#### 1. Knowledge :

Knowledge is defined "as the remembering of previously learned material." It may include the behaviours which emphasise on the recall of a wide range of ideas, materials or phenomenon. The pupil is expected to recall certain piece of information which he has learned earlier. In the cognitive domain, knowledge is the simplest form of learning.



The General and Specific Learning outcomes under knowledge are as following.

General Instructional Objectives	Specific Learning Outcomes in terms of students behaviour
<ul style="list-style-type: none"> <li>• Knowledge of Terminology</li> <li>• Knowledge of specific facts</li> <li>• Knowledge of methods and Procedures.</li> <li>• Knowledge of principles and generalisation.</li> <li>• Knowledge of conventions.</li> <li>• Knowledge of trends and sequences.</li> <li>• Knowledge of classification.</li> <li>• Knowledge of basic concepts.</li> </ul>	<ul style="list-style-type: none"> <li>• The student can define identify and give references for specific verbal and nonverbal symbols.</li> <li>• Here the student has to recall dates, events, persons sources of information.</li> <li>• It involves the methods of inquiry, techniques and procedures employed in a specific subject field.</li> <li>• The pupil can find out particular abstractions which summarise observation of phenomena.</li> <li>• Pupil can find out ways of dealing with and presenting ideas.</li> <li>• Pupil can outline and state the process, directions and movements of phenomena with respect to time.</li> <li>• Pupils can classify different categories, names, sets and dimensions.</li> <li>• Pupil can define and state different concepts.</li> </ul>

## 2. Comprehension :

Comprehension is the "the ability to grasp the meaning of material". It involves the activities like translating the material from one form to the other, interpreting the material and predicting future trends. It requires a little higher order of learning ability than knowledge. An example of General learning outcomes and Specific learning outcomes under comprehension is given below:

General Instructional Objectives	Specific Learning Outcomes in terms of students behaviour
<ul style="list-style-type: none"> <li>• Understanding of facts and principles.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can distinguish between true and false facts and statements. He can also explain the given facts.</li> </ul>



<ul style="list-style-type: none"> <li>• Interpretation of materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can understand a graph and chart, can predict the future trend of a graph and can explain the facts given in a graph or chart.</li> </ul>
<ul style="list-style-type: none"> <li>• Translation of material from one form to another.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can translate verbal material into mathematical formula, can translate pictorial material to verbal forms.</li> </ul>
<ul style="list-style-type: none"> <li>• Estimate future trends</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can estimate the future consequences of data, can infer the future trend from the present data.</li> </ul>
<ul style="list-style-type: none"> <li>• Justify methods and procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can justify the appropriateness of methods and procedures for particular purpose.</li> </ul>

### 3. Application :

Application is defined as the "ability to use learned material in new and concrete situations." This ability is evidenced when student can apply certain rules, methods, concepts, principles and theories in order to arrive at the solution of a problem. It requires a higher level of understanding than comprehension. An example of different general and specific learning objectives under application is given below :

General Instructional Objectives	Specific Learning Outcomes in terms of students behaviour
<ul style="list-style-type: none"> <li>• Application of principles.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can apply the learned principles to produce some thing, to solve some new problems, or compute something.</li> </ul>
<ul style="list-style-type: none"> <li>• Application of theories</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can apply learned theories in the practical situations to change, to discover, to identify or to illustrate something.</li> </ul>
<ul style="list-style-type: none"> <li>• Solution of new problems</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can solve different problems by applying the learned methods and procedures, can solve mathematical problems.</li> </ul>
<ul style="list-style-type: none"> <li>• Construction</li> </ul>	<ul style="list-style-type: none"> <li>• The pupil can construct graphs and charts, can prepare maps and different equipments for experimentation.</li> </ul>



**4. Analysis :**

Analysis refers to the "breakdown of the material into its constituent parts and detection of the relationships of the parts and of the way they are organised." Thus analysis is to understand the organisational structure of a material by breaking down its components into different parts. According to Bloom analysis involves three major processes

- Analysis of the parts.
- Analysis of relationship between parts.
- Analysis of organisational principles involved.

It requires the ability to understand the content and structure of the material. Therefore, it involves a higher intellectual ability than the comprehension and application. Below is given an example of General and Specific learning outcomes under analysis.

General Instructional Objectives	Specific Learning Outcomes in terms of students behaviour
<ul style="list-style-type: none"> <li>• Analysis of parts</li> </ul>	<ul style="list-style-type: none"> <li>• The pupil can recognise different parts of a graph, chart, map, can recognise the unstated assumptions. Breaks down different parts into components. Illustrate each part. Prepare diagram of each part.</li> </ul>
<ul style="list-style-type: none"> <li>• Analysis of relationships</li> </ul>	<ul style="list-style-type: none"> <li>• The pupil can find out the relationship between different parts, point out the parts, separate the parts.</li> </ul>
<ul style="list-style-type: none"> <li>• Analysis of organisational principles.</li> </ul>	<ul style="list-style-type: none"> <li>• The pupil can find out the organizational structure of a work like art, music, writing etc. can distinguish between two materials.</li> </ul>

**5. Synthesis :**

Synthesis refers to "putting together of elements and parts so as to form a whole. This involves the process of working with pieces, parts elements and arranging and combining them in such a way as to constitute a pattern or structure not clearly there before." This is the ability to produce a unique communication, production of a plan or proposal of operations and development of a set abstract relations. It involves the creative aspect of the individual personality. It emphasises on the creation of new patterns or structures. It requires a higher order of mental ability than the analysis.



Some of the General and Specific instructional objectives under synthesis are as following :

General Instructional Objectives	Specific Learning Outcomes in terms of students behaviour
<ul style="list-style-type: none"> <li>• Production of a unique communication.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can write an essay, story, poem, can give an organised speech, can write a novel, or drama, can give a creative statement, device, designs etc.</li> </ul>
<ul style="list-style-type: none"> <li>• Production of a plan or proposal of operations.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can propose new plans for experiment, can rearrange, and reconstruct the given material, can integrate learning from different areas into a plan for solving problems.</li> </ul>
<ul style="list-style-type: none"> <li>• Development of a set of abstract relations.</li> </ul>	<ul style="list-style-type: none"> <li>• the pupil can formulate new schemes for categorising, organising, recognising and restructuring objects, devices and designs.</li> </ul>

### 6. Evaluation

Evaluation is defined as the "ability to judge the value of material for a given purpose." The judgement is made on the basis of some criteria. It is the highest order of learning in the cognitive hierarchy. This involves the elements of all the other categories (knowledge, comprehension, application, analysis and synthesis) along with value judgement. Some of the general and specific learning outcomes under evaluation aspect are as following :

General Instructional Objectives	Specific Learning Outcomes in terms of students behaviour
<ul style="list-style-type: none"> <li>• Judge the organisation of material.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can evaluate or judge the consistency of a material like music, art or written material.</li> </ul>
<ul style="list-style-type: none"> <li>• Judge on the basis of internal criteria.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can judge the value of a work like a music, art, writing using the internal standards. He can compare and criticize on the basis of this evaluation. He can justify the relevance of the material for a particular purpose.</li> </ul>
<ul style="list-style-type: none"> <li>• Judge on the basis of external criteria.</li> </ul>	<ul style="list-style-type: none"> <li>• Pupil can judge the value of a work like music, art, writing using</li> </ul>



	external standards. He can compare the work with other works and can discriminate the work from other works.
• Judge the adequacy of material.	• Pupil can judge the adequacy of a given material with which conclusions are supported by data.

## AFFECTIVE DOMAIN :

Affective domain is concerned with feeling. Affective domain includes the objectives which describe the change in attitudes, interests, appreciation and modes of adjustment. The major categories included in the affective domain are Receiving, Responding, Valuing, Organization and Characterization. Krathwohl in 1964 has given these five categories of objectives under affective domain. These classes are also further divided into sub-classes under the heading of 'General Instructional Objectives' and 'Specific Instructional Objectives'.

### 1. Receiving :

Receiving is defined as "the student's willingness to attend to particular phenomena or stimuli." It is the sensitivity of an individual to the existence of certain stimuli or phenomena. In the teaching learning situation it involves the activities like getting, holding and directing students activities. Receiving is the lowest level of learning in the hierarchy of affective domain.

General Instructional Objectives	Specific Learning Outcomes in terms of student's behaviour
• Awareness	• Asks questions about something, identifies a particular object. Names the object. Replies about the object.
• Shows Sensitivity	• Shows sensitivity towards social problems. Asks questions about the problem. Identifies the problem areas.
• Selective attention.	• Pays attention to the differences in the culture and race. Chooses the best one, describes the differences. Differentiates a given stimulus into figure and ground.

### 2. Responding :

Responding means "active participation on the part of the student." Here the