



**M.A.(EDUCATION) PART-II
(SEMESTER-III)**

**PAPER- I
EDUCATIONAL TECHNOLOGY**

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UNIT NO. 1

**Department of Distance Education
Punjabi University, Patiala**

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Lesson No.

UNIT NO. 1

- 1.1 : Educational Technology : Meaning, Concept, Objectives, Functions and Scope
- 1.2 : Types and Forms of Educational, Technology
- 1.3 : Levels of Teaching : Memory Level, Understanding Level and Reflective Level
- 1.4 : Objective Sepecification : Educational and instructional ojectives, categorization of objective in taxonomic categories of congitive, affective and psychomotor domains, writing instructional objectives in behavioural terms

Note : Students can download the syllabus from department's website www.dccpbi.com

**Educational Technology : Meaning, Objectives
Concept, Functions and Scope**

Structure of the Lesson

- 1.1.1 Objectives of the Lesson
- 1.1.2 Educational Technology : Meaning and Concept
- 1.1.3 Objectives of Educational Technology
- 1.1.4 Functions of Educational Technology
- 1.1.5 Scope of Educational Technology
- 1.1.6 Suggested Questions
- 1.1.7 Suggested Books

1.1.1 Objectives of the Lesson : Students will be able to -

- (i) Define Educational Technology
- (ii) Explain functions of Educational Technology
- (iii) Explain scope of Educational Technology.

1.1.2 Educational Technology : Meaning and Concept

The application of scientific knowledge to the practical tasks of life, formed a new area named 'Technology'. Educational Technology means the use of technology for maximising the learning experiences. It means structuring the environment for learning. This process of educational structuring and management of educational environment with the help of hardware and software that is available or that can become available to the best advantage of learner is the concept of Educational Technology. It means the sum total of all educational facilities, media, methods and techniques for optimizing learning.

Educational Technology can be taken to mean two things (i) introduction of technological innovations in the field of education or (ii) technologizing education to optimize learning outcomes. It is a systematic science of its own penetrating the whole educational system. As a method, it implies making use of new devices such as programmed learning, team teaching, micro-teaching, personalized system of instructions as methods in teaching-learning situations. Educational Technology means the application of system analysis to teaching and learning. Also, Educational technology means the sum total of educational facilities, media, methods and techniques for optimizing learning. It involves facilities of learning through resource mobilization and utilization of learning principles. It can be conceived as a science

of techniques and methods by which educational goals can be realized. It has potentialities to make education effective and mass-based and bring in desirable functional changes in the structure of education.

There is need for reorganisation of approach which can integrate students, teachers, hardware and appropriate software into an economic and efficient whole. Every element in such a system will contribute its maximum and compliment to each other according to the socio-psychological needs of the learner. The Educational Technology see whether by a given process of situation the definite goals could be achieved. **Educational Technology involves four stages in this regard :**

- (1) To identify the various components that operate from the stage of input to that of the output.
- (2) To explore the various functions of these components which are performed separately or in conjunction with other components.
- (3) To observe the effect of manipulating the various components and their functions in the field.
- (4) To prepare guidelines for the practitioner.

Another meaning of Educational Technology is the mechanization of educational process. The mechanization is being done in all the three phases of human knowledge very rapidly i.e.

- (1) Preservation of knowledge
- (2) Transmission of knowledge and
- (3) Advancement of knowledge

The knowledge is being preserved in books by the use of printing machines. Class rooms interaction can be preserved as a whole i.e. voice expression, actions of the teacher, content used in class-room and the responses, instruction of the pupils by the use of radio, tape, film etc. Educational Technology supplement the teaching of a teacher.

Transmission of knowledge means providing education to far distant pupils and from one generation to next generation. A limited number of students can be benefited by the class-room teaching, but a large number of students sitting at distant places can be taught with the help of radio and television.

The advancement of knowledge means addition of something new to the previous ones. Data collection and analysis provides something new to the old ones. This analysis can be done with the help of computer services. These electronic machines yield more dependable results.

Educational Technology may be seen as a mediator, necessary for combining the science of learning with the art of teaching.

Technology is related to education in at least three major ways. First the society, in which science and technology are primary, requires the educational system to ensure an adequate supply of scientists and associated technicians. Second as a society becomes more and more technologically oriented and controlled, the survival and management of the whole society require more general education in the sciences and technology for all. Third, because of the tendency for technology to have no limits and constantly to extend into new areas. These three relationships i.e. development of technicians in general educational technology, and the applications of technology to the instructional process cannot eventually be separated.

Definitions of Educational Technology

The term Educational Technology has been defined differently by different persons; few of the definitions are given below.

According to National Council of Educational Technology (1967), Educational Technology is "the development, application and evaluation of systems, techniques and aids to improve the process of human learning."

According to G.O.M. Leith, "Educational Technology is the systematic application of scientific knowledge about teaching, learning and conditions of learning to improve the efficiency of teaching and training. In the absence of scientifically established principles, Educational Technology implements techniques of empirical testing to improve learning situation." It means "Systematic and objective structure of components of teaching, which has cause and effect relationship crossing the goal-oriented components."

According to **B.C. Mathis**, "Educational Technology refers to the development of a set of systematic methods, practical knowledge for designing, operating and testing school as educational system." As there is a direct relationship between teaching and learning but Mathis could not explain this relationship. He has only emphasize the development of techniques and skills for testing pupils' performance.

E.E. Hadden defined the term Educational Technology as, "It is the branch of educational theory and practice which is concerned primarily with the design and use of message which control the learning process. The definition involves both theory and practice in the teaching-learning process for effective communication.

According to **R.M. Gagne** "Educational Technology can be understood as meaning of the development of a set of systematic techniques and accompanying practice knowledge for designing, testing and operating schools as educational systems." Gagne considers process and output aspects but does not refer to the learning objectives. He has pointed out two aspects of educational system development of teaching techniques and designing the measuring instruments for testing students performance.

W.K. Richmond (1970) has stated, "Educational Technology is concerned to provide appropriate learning situations keeping in view the objectives of the teaching or training that brings to bear the best means of instruction." Richmond brings clarity among means of instruction, objectives of teaching and learning.

Unwin (1968) defined educational technology as "It is concerned with the application of modern skills and techniques to the requirement of education and teaching. It includes the facilitation of learning by manipulation of media and methods, and the control of environment in as far as this reflects on learning." Unwin tries to interpret the practical aspect of skills and techniques for the betterment of environment for effective learning. He also writes about facilitation of learning outcomes by proper use of media and methods.

S.K. Kulkarni (1979) has defined "the term Educational Technology as, the application of the laws as well as recent discoveries of sciences and technology to the process of education." In this definition Kulkarni could not interpret the input and output aspects of education but he has pointed out in the educational process by employing laws and principles of sciences and technology.

According to **S.K. Mitra**, "Educational Technology can be conceived as a science of techniques and methods by which educational goals be realized." Mitra interprets the relationship between methods of teaching and educational goals.

Educational Technology has to be seen as a part of a persistent and complex endeavour of bringing pupils, teachers and technical means together in an effective way. It is an organised design and implementation of learning system taking advantage of modern teaching techniques, audio-visual aids and class room organisation (By 6. R : Cases of Educational Technology Division O.E.C.D. in an interview to a Ford Foundation Team, December, 1971).

Educational Technology is a field involved in the facilitation of human learning through the systematic identification, development, organisation and utilization of a full range of learning resources through the management of these processes. It includes, but is not limited to the development of instrument of instructional system, the identification of existing resources, the delivery of resources to learners and the management of these processes and the people who perform them.

"Educational Technology may be defined as a separate field in the theory of Educational dealing with the development and application of the use of educational resources". It implies the following principles :

1. Clear educational objectives.
2. The logical order of the elements of contents.
3. The structure of the teaching - learning process.

4. The development of models leading to the acquisition of knowledge;
5. The introduction of feed back with the teaching - learning process;
6. Media selection and criteria of a media selection; also media evaluation.
7. The development of equipment that meets educational, economic, aesthetic and technical demands.
8. The study of the effectiveness of hardware and software in practical situations and;
9. The various approaches to effectiveness in educational systems.

(From the working paper prepared by the Preparatory Committee for the International Seminar on Alternative Strategies for the introduction of Educational Technology- National Centre for Educational Technology, Hungary with the assistance of UNESCO/ UNDP).

Educational Technology is the organised design and implementation of learning systems and is taking advantage of it but not expecting miracles from modern communication methods, visual aids, class room organisations and teaching methods. "Educational Technology involves the development and application of system, techniques and aids to improve the process of human learning."

Thus Educational Technology concern the efforts to provide appropriately designed learning situations which bring the best means of instructions. These means may involve modification of the learners' environment through techniques of presentation, arrangements of learning activities and organisation of the social and physical surrounding. Educational Technology can be considered as a means to accomplish some predetermined, clearly defined educational and instructional objectives. Educational Technology should not be confused with teaching or instruction of education or learning of engineering but it should be taken as a sum total of all such aspects which go a long way in shaping the personality of the learner in a meaningful context.

1.1.3 Objectives of Educational Technology

R.A. Sharma has pointed out the following objectives of Educational Technology :

1. To determine the goals and formulate the objectives in behavioural terms.
2. To analyse the characteristics of the learner.
3. To organize the content in logical or psychological sequence.
4. To mediate between content and resources of sequence.
5. To evaluate the learners' performance in terms of achieving educational objectives.

6. To provide the feedback among other components for the modification of learners.

These objectives of educational technology have been formulated in a communication context within which all teaching and learning may be viewed.

1.1.4 Functions of Educational Technology

Educational Technology has affected the traditional functions of teachers in which the teachers used to be the role interpreters of knowledge. It has opened up the new areas of teacher functions such as management of resources and management of learning. In both these roles, alongwith their traditional roles, educational technology may prove to be an asset to the teachers :

1. It provides a scientific base to the educational theory and practice. It also provides an impetus for classroom research.
2. The introduction of educational technology has caused **modernization** in the teaching-learning environment of the institutions. It also gives an opportunity to the learners to be exposed to professionally designed programmes on video or computers.
3. It **supplements the teachers** in their instructional programmes. So the learners get the training of self-introduction and teachers are relieved from the burden of routine repetition of exercise and revision purposes. In this way the teachers save some time of their routine teaching. That time may be utilised for creative work and quality improvement.
4. The training use of educational technology contributes towards the **professional growth of teachers**. Its training equips them in the use of scientific method of solving educational problems.

The functions of educational technology are shared in varying degrees by all who are concerned with its purpose for the facilitation of human learning.

In the particular context of the developing countries in Asia, educational technology is seen both as a means as well as services to effect and facilitate better and more productive learning systems. It is an integral part of both formal and non-formal education. One aspect of educational technology related to the use of special techniques such as ETV, Radio, programmed learning and other audio-visual aids. In other aspects, educational technology is seen as the application of scientific and other organised knowledge to the problems of education. In the particular context of the developing countries, the emphasis is on the human as well as technological resources. (From Report of the Technical Working Group for Educational Technology in Asia under APIED, 1975).

1.1.5 Scope of Educational Technology

The great importance of Educational Technology is in the formulation and development of teaching theory. The scope of Educational Technology depends upon in what context the term educational technology is used. In the first case, if educational technology is used as the audio-visual aids, mechanical and electric gadgets, the scope is limited to improve the educational messages. When the term Educational Technology is used as the process oriented technique then its scope is limited to the production of teaching learning material. Thus it is basically the technique of software development. In addition to these, Educational Technology covers the following aspects :

1. Improvements in **teaching-learning process**.
2. **Audio Visual Aids** can be used for educational purposes.
3. **Improvement in standard of education** by the use of modern teaching techniques.
4. The correspondence education can be made more effective by the use of films, television, video films, programmed instruction etc. Educational programmes can be organised with the help of these Audio Visual Aids.
5. Educational **administrative problems** can be solved scientifically with the help of System Analysis.
6. Educational Technology has broken a new field for experimentation for class room teaching and training problems.
7. It has developed **new innovative practices and strategies** for individual differences among learners.
8. It provides the **scientific foundation to education** and develops theories of teaching and instruction.

Thus we find that the scope of educational technology is very wide. It is concerned with all the models, variables, phases, levels and dimensions of aspects of teaching-learning process. It teaches (i) the teachers the art of teaching (ii) the learners the science of learning (iii) the educational planners the structure of planning and (iv) the administrators the skill of administering the risk of teaching and learning. Educational technology reaches to the individuals, groups and the masses through the use of mass media and means. The use of mass media for educational purposes have added another new field to the scope of educational technology.

1.1.6 SUGGESTED QUESTIONS

1. Define the term Educational Technology. Explain its meaning in your own words.

2. What is the concept of Educational Technology? Discuss its scope.
3. Write down meaning, functions and scope of Educational Technology.

1.1.7 SUGGESTED BOOKS

1. Bhushan, A & Ahuja, M. Educational Technology, Vivek Publishers, Meenakshi Pura, Meerut, India, 1992.
2. Ruhela, S.P. Educational Technology, The Associated Publishers, Kacha Bazar, Ambala Cantt. 1991.
3. Sampath et. al. Introduction to Educational Technology, New Delhi, Sterling Publishers, Pvt. Ltd. 1981.
4. Sharma, A.R. Educational Technology, Vinod Pustak Mandir, agra 1985.
5. Sharma R.A. Technology of Teaching, International Publishers Meerut 1986.

Structure of the Lesson

- 1.2.1 Objectives
- 1.2.2 Introduction
- 1.2.3 Types of Educational Technology
- 1.2.4 Forms of Educational Technology
- 1.2.5 Suggested Questions
- 1.2.6 Suggested Books

1.2.1 Objectives : Students will be able to -

- (i) define types of Educational Technology
- (ii) differentiate between Hardware approach and software approach
- (iii) explain forms of Educational Technology.

2.2 Introduction :

Educational Technology is the application of scientific knowledge about learning, the conditions of learning, to improve the efficiency of teaching and learning. It is an applicational body of knowledge. It seeks help of the laws and findings of psychology, sociology, engineering and some other basic, social and physical sciences. Educational Technology is a much wider concept of body of knowledge than the audio-visual aids and programmed instruction. Its techniques and materials are just some of the parts of it. Its aim is to improve teaching learning situations as Leith has mentioned in his definition, "to improve the effectiveness and efficiency of teaching and training" or as the definition of Educational Technology given in 1967 by the National Council for Educational Technology, U.K. also emphasizes "**to improve the process of human training.**"

1.2.3 Types of Educational Technology

There are three major types of Educational Technology. These are as under :

1. Hardware approach.
2. Software approach
3. Instructional designs approach.

1. Hardware Approach

It has the major assumption that a technology of machines is closely related to a technology of teaching. It is important to note that the **teaching machine** is the

only **mechanical aid** to be deliberately designated and invented to fulfil an instructional requirement. The process of teaching-learning has been gradually mechanized by the use of teaching machines, language laboratory, radio, television, tape-recorder, video tape and projects. The Educational systems are able to deal with an increased number of students and the cost per student has been reduced by the hardware approach to education. **Silverman 1968** called this type of Educational Technology '**Relative technology**'. This refers to borrow and to apply technology, machines and devices in the process of teaching and learning. Now a days distance education becomes popular among the people. So it is easy to provide the distance education, correspondence education through Radio, Television and film strips etc. i.e. hardware approach of Educational Technology.

2. Software Approach

It refers to the **application of teaching learning principles** to direct and deliberately shaping of behaviour. Its origin lies in the application of **behavioural science** to solve the problem of learning and motivation. It is concerned with learning aids like **programmed instruction** and **models of teaching**. It is closely associated with the principles and theory of teaching, model of teaching, theory of instruction, theory of teacher behaviour and principles of programmed learning. Silverman (1968) termed this Educational Technology as the "**Constructive Educational Technology**" It is the basic educational application dealing with :

- (1) The analysis of instructional problems.
- (2) The selection or construction of measuring instruments required to evaluate instructional outcomes, and
- (3) The construction or selection of strategies and tactics to produce the desired educational outcomes.

3. Instructional Designs Approach

It is also known as '**System analysis.**' It refers to the analysis and development of systems. It assumes that no comprehensive system development can take place without system analysis. The term system includes **utilization of scientific mathematical techniques** applied to organizational operations and problems of management as a part of decision making activities. It is essentially a management approach, influencing management decision making in business, industry, government, military and the education. These streams gain reasonable standardization due to system analysis.

In this approach one has to make a continuous comparison of the different roles played by man, machine and media in a system of education and developed an appropriate instructional design and strategy in relation to the stipulated objectives. System analysis helps the designer carefully and studying interaction of components

with one another and with other outside systems. The use of new systems of technology in the educational systems has brought to educational management a scientific-quantitative approach for solving administrative problems.

1.2.4 Forms of Educational Technology

The mechanization in one form or another used to improve teaching learning process results in the development of education. The various forms of educational technology are as under :

1. Teaching Technology
2. Instructional Technology
3. Behavioural Technology

1. Teaching Technology

Exponents of this form are **Herbert, Morrison, Hunt and Davies**. Technology is system of actions which induce **learning through interpersonal relationship**. Teaching Technology is the application of philosophical, sociological and scientific knowledge of teaching for achieving some specific learning objectives.

Assumptions : The assumptions of this form of technology are as under :

1. Teaching is a scientific and tripolar process.
2. The teaching situations can fruitfully bring desired learning outcomes.
3. There is close interaction between teaching and learning.
4. The teacher behaviour and other teaching activities can be modified.
5. Various feedback devices results in the development of required teaching skills.
6. A successful teaching - learning process results in the achievement of learning objectives.

Contents : I.K. Davies and Glaser (1962) developed the content of technology of teaching and classified into four elements :

1. **Planning of teaching :** It includes content analysis, identification of objectives and writing objectives in behavioural terms.
2. **Organisation of Teaching :** It consists of teaching strategies and tactics for achieving the objectives of teaching.
3. **Leading of Teaching :** The techniques of motivation are employed for leading the behaviour of the students. The improvement in the interaction between teacher and pupils comes under this step.
4. **Controlling of Teaching :** It means evaluation of teaching. The main focus of this step is to assess the learning outcomes in terms of

student's performance. The pupil's performance provides the basis for the feedback to teacher and students.

Characteristics of Teaching Technology

It has the following characteristics :

1. The objectives : **Cognitive, affective and psychomotor** can be achieved by this form.
2. The content structure can be related to communication structure for achieving the learning objectives.
3. The philosophical, sociological, psychological and scientific knowledge can be applied to teaching process.
4. The teaching can be organised from memory levels to reflective level.
5. The teaching process can be improved through this form.
6. The pupil Teachers and **in-service teachers** can improve themselves through this form.
7. It implies all the three aspects of education i.e. input, process and output.
8. The theories of teaching can be formulated by the use of this form.

2. Instructional Technology

Technology is a force of significant in most aspects of modern civilization and it is no less significant in the field of education. The instruction has significant role in human learning because most of the human learning is accomplished through instruction while animal learning through conditioning. '**Programmed Instruction**' is the most important example of Instructional technology. According to Charles. F. Hoston, "Instructional technology means the management of ideas, procedures, money, machines and people in the instructional process."

Bruner, Ausubel, Glaser and Skinner are the exponents of this form.

Instruction means the systematic actions which induce learning. Technology means science of techniques or methods. So instructional technology means a net work of techniques or devices employed to accomplish certain defined set of learning objectives. It implies the application of psychological, sociological and scientific principles and knowledge to instruction for achieving the specific objectives of learning.

Assumptions : Its basic assumptions are as follows :

1. Each element of one content matter can be presented independently.
2. Arrangement of these elements be done in logical sequence to create external learning situation.

3. The student can learn according to his needs and pace of learning.
4. Through proper instructions, suitable reinforcement can be provided.
5. The theories of instruction can be used accordingly to achieve learning objectives.
6. The student can learn successfully with the indirect help of teacher.

Content

Teaching is an instruction but the instruction is not the teaching. The instruction technology consists of the following content :

1. Meaning and definition of instructional technology.
2. Origin, concept and types of programmed instruction.
3. Meaning, assumptions and structural linear, branching and mathematical programming.
4. Learner controlled instruction and computer assisted instruction.
5. Planning, writing and evaluation of programmed instruction material.
6. Primping and promoting devices.

The development of technology of the instructional process is relatively new. In the pre-industrial phases of both education and industry, while industry principally in the hand work at artisan level, the instructional process relied upon some devices is such as the slate, the chalk and chalkboard etc.

Characteristics of Instructional Technology

Some of the characteristics of Instructional technology are as under :

1. The cognitive objectives can be achieved effectively by the use of this form.
2. The individual differences are recognised as the learner gets an opportunity to learn according to his own speed.
3. Pupils get immediate reinforcement as right responses of the pupils are confirmed.
4. It incorporates the psychological learning theories and principles.
5. External learning conditions are created with the help of instructions.
6. It provides the deep insight into content structure and sequence of its elements.
7. Students learn themselves with the indirect help of teachers.
8. The instructional theory may be developed by using this form of technology.

3. Behavioural Technology : Amidson N.A. Flanders, B.F. Skinner, Ober and Anderson are chief exponents of the Behavioural Technology. As the learning is the modification of behaviour through activities and experiences, so this form of technology has a wider area to cover. It includes the area of industry, defence, commerce, communication, administration, health, motivation, teaching and instruction. The behavioural technology is the application of scientific knowledge in modifying the teacher behaviour. This is also termed as **training technology**.

Assumptions : It assumes :

1. Teacher behaviour is **observable**.
2. Teacher behaviour is **relative**.
3. Teacher behaviour is **measurable** and **quantifiable**.
4. Teacher behaviour is **social** and **psychological**.
5. Teacher behaviour consist of both the elements.
 - a) Indirect teacher behaviour and
 - b) Direct teacher behaviour

There is correlation between these two elements of teacher behaviour. Teacher behaviour can be modified through the use of various devices, interaction patterns, skill orientation etc.

Content : The behavioural technology includes the theory and practice of class room teaching and teaching behaviour. Its contents are as follows :

1. Meaning and definition of teacher behaviour.
2. Theory and assumptions of teacher behaviour.
3. Class-room interaction patterns.
4. The interpretation and evaluation of the teacher behaviour.
5. Teaching modes and their implications for the class room.
6. Modern teaching techniques such as :
 - i) Micro-teaching
 - ii) Team teaching
 - iii) Simulated teaching etc.
 - iv) T-Group training.

The behavioural technology includes not only class room teacher behaviour but also mechanism of feedback devices for modification of teacher behaviour and teaching skills.

Characteristics of Behavioural Technology

The important characteristics of behavioural technology are as follows :

1. The psychomotor objectives can be achieved through this form as it includes the development of specific required teaching skills.
2. The class room interaction pattern can be improved.
3. It is an instrument for colleges of education to produce effective teachers.
4. The verbal as well as non-verbal reinforcement in correlation with each other can be provided during teaching practice.
5. The content and communication aspects can be improved by the use of feed back devices.
6. The performance of teacher can be evaluated objectively and systematically with the help of this technology .
7. The behavioural technology may be helpful in developing the theory of teaching.
8. Simulated social skill teaching and interaction analysis are its examples.

Thus various forms of educational technology give us a clear picture of its multidimensional approach to education for making it more systematic and precise. As education has become a separate discipline, it has its vertical and horizontal expansions so it has come up with its various forms to be used in different contexts to make education meaningful.

1.2.5 SUGGESTED QUESTIONS

1. Write in detail the various forms of educational technology.
2. Explain the different types of educational technology.
3. Write short notes on the following :
 - (i) Hardware approach.
 - (ii) Software approach.

1.2.6 SUGGESTED BOOKS

1. Bhushan, A. and Ahuja, Malvinder : Educational Technology, Vivek Publishers, Meenakshi Puran Meerut, 1962.
2. Sodhi, A.S. and Dutt, Sunil : Educational Technology, Sumir Publications Chandigarh, 1963.
3. Sharma, A.R. : Educational Technology, Vivek Pustak Mandir, Agra, 1985.
4. Sharma, R.A. : Technology of Teaching International Publishers Meerut, 1986

Lesson No. : 1.3

Author : Dr. Anand Bhushan

**Levels of Teaching : Memory Level
Understanding Level and Reflective Level**

Structure of the Lesson

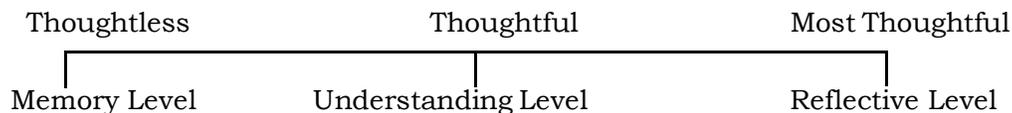
- 1.3.1 Objectives
- 1.3.2 Introduction
- 1.3.3 Teaching at Memory Level
- 1.3.4 Teaching at understanding level
- 1.3.5 Teaching at Reflective Level
- 1.3.6 Summary
- 1.3.7 Suggested Questions
- 1.3.8 Suggested Reading

1.3.1 Objectives : Students will be able to -

- (i) define level of teaching
- (ii) explain teaching at memory level
- (iii) explain teaching at understanding level
- (iv) explain teaching at Reflective level.

1.3.2 Introduction

A teaching-learning situation is assessed on the basis of where it falls on the continuum which ranges from "thoughtless" to "thoughtful" modes of operation. We can conveniently divide this range of teaching operations into three major categories:



Out of these, memory level is the most thoughtless and reflective level is the most thoughtful level.

1.3.3 Teaching at Memory Level

Teaching at this level is simply committing factual material to memory. It is possible to memorize any type of material, even the meaningless material. However, it is easier to learn and retain material which is meaningful. A collection of non-sense syllables may also be retained for time if the person has sufficient reason to remember it.

Basic Rationale

Rote memory learning seems to exemplify mental discipline (substantive mind is trained) or an S-R associationistic theory of learning (linkage are formed). But cognitive field psychologists insist that some sort of insight always present while learning a material.

Learned material is 'patterned' by a learner during the process of learning if the material in itself has no pattern.

Relationship of Intelligence and Rote Memory Learning

Capacity to memorize and retain material probably bears no direct and positive relationship with capacity for intelligent behaviour. Even geniuses have been seen to be notoriously forgetful., John-Vat Neumann, creative mathematician, is an example of extreme forgetfulness (except his major area of interest). On the other hand, Polly, a 13 years old imbecile girl, could memorize indiscriminately anything she heard and often could repeat verbatim after hearing once a conversation or news cassette. She could recite faultlessly all popular songs. But her thought process was of the level that when asked to close an outside door, she could not decide which side of the door should stand to avoid shutting out herself.

In schools, students who achieve low scores have been found to perform remarkably in colleges. In classes, where rote memorization is stressed, some students achieve high scores but when put into problematic situation, their achievement shows a marked decline.

Memory level teaching, however, contributes indirectly to intelligent behaviour e.g. as memorized facts becomes pertinent on occasion when a solution to a problem is required. At such times usability of memorized facts (rote-memory learning) increases effectiveness of problem-solving. However, they contribute very little to effective student growth because they tend to be forgotten easily and are irrelevant for future thought and needs. No useful results should be expected from memory-level teaching, yet there are some areas where teachers have to adopt it. To avoid memory-level teaching altogether is quite unrealistic. Even most imaginative teachers use it here and there, e.g. spellings etc. are best learnt at this level.

Social environment in a memory level class-room

The teacher is an authoritarian one, when teaching at memory level.

He/she exercise firm and centralized control.

He/she directs all the activities in the class.

Teacher is the sole active agent and students are passive recipients of instructions and information.

In experiments with group climates, conducted by Lippitt and White, it was found that students in authoritarian groups tended to be apathetic and dependent and to lack initiative. In the absence of leader, their accomplishment was very little. Students expressed their hostility towards authoritarian leadership through aggressive acts towards fellow group members.

Evaluation at memory level

Evaluatory items are prepared considering that the nature of learning involves factual material and text-items are measuring simple recall and recognition. Short answer,

multiple choice, completion type and alternate response type items are most appropriate at this level. Students answers are checked against a list prepared at the time the test is made.

1.3.4 Teaching at Understanding Level

What is Understanding?

The term 'understanding has been used so ambiguously by psychologists that people use that term without being able to define it clearly. Understanding, as a product of learning process, involves much more than simple 'yes I understand (i.e. "I know that you are talking about").

Bigge & Hunt refers to three categories of definitions of understanding :

(1) Understanding as seeing relationship

This category includes dictionary definitions of the word understanding i.e.

- to perceive the meaning of
- to grasp the idea of
- to comprehend (to take in or embrace)

Here, we have the idea of reaching out and gathering individual items. As they are pulled together, they are understood. Seeing solitary facts in relation to a general principle is the essence of understanding e.g. a new teacher who has a diverse group in his class find it difficult to understand the behaviour of each child individually. However, slowly he/she start analysing that the behaviour of a child (may be rough dirty clothing etc.) depends upon socio-economic conditions prevailing around him. Supposing he/she generalised that children from low-middle class use abusive language and are dresses dirty, he/she can classify each new child into a class i.e. he pulls individual behaviour into a class i.e. he has pulled children together.

(2) Understanding as seeking tool-use of a fact

A person understanding a thing can be used to fulfil some goal (thing can be existing object, process, idea or a fact). The degrees of one's understanding is always relative e.g. if I know that a person takes a photograph I have begun to understand a camera. But to use a camera successfully, I need to know the details of operating camera i.e. different types of lenses, lighting, picture compositions, focussing a picture etc.

(3) Understanding as seeking both, relationship and tool use

In order to have an adequate definition of understanding, we must consolidate the previous two definitions. Simply to see relations without purpose, will not be for future use or will have no transfer value e.g. to relate a principle with a generalization has no value until its purpose of future use is also established. Otherwise it will be superficial achievement.

Understanding is also best achieved when motivation is there. Also specific insights tend to be generalized. When one achieves insight, we assess it is other or all similar situations, if it fails to work, it will be discarded as having extremely limited worth. If it works in all similar situations, it will become a valued possession.

John, F. Herbert, Charles H. Judd, Henry C. Morrison and Jerome S. Burner have provided most significant leadership in the development of understanding level teaching based upon their respective conceptions and nature of understanding level learning.

Herbart's contribution to understanding level of teaching

According to **Herbert**, psychology is considered as mental chemistry. Arrangement or ideas in mind is like electrons in atom. Constituents of a mind are mental elements which are called mental states, idea, concepts or notions (mental state being unpredominantly). Mental state has three forms.

- Sense impression;
- Images or copies of previous sense impression.
- Affective elements of pleasure and pain.

Mind is an aggregate of mental states (active structure of mind) and a person's stock of mental states at any time has apperceptive mass. New things are learnt as they are related to what exactly exists in the apperceptive mass.

All mental states have an inherent quality of affinities of some ideas, aversion for some other, e.g. book and school have an affinity and are understood easily, whereas fishing rod and book are repulsive. Each idea of mind has at some stage been in the centre of consciousness. When new ideas come to the focus of consciousness then previous ideas go to the subconscious but they are revived at any later stage. Actually all have a fight to resume previous position of attention, and which-ever passes the threshold of consciousness again comes back to consciousness. This would be controlled by :

- Principle of frequency and
- Principle of association.

i.e. more often an idea has been brought into consciousness, the easier becomes its return. And when a number of presentation of idea associate or form a mass, the combined powers of the mass determine the ideas which will enter consciousness.

Herbart and his followers assume that learning proceeds through an ordered series of steps which a teacher should understand and follow. There are :

- (i) **Preparation** : to bring into consciousness relevant ideas, the teacher reminds students of certain experiences they had about the concept ;
- (ii) **Presentation** : The teacher presents new facts about the new concept through demonstration of verbal expression ;
- (iii) **Comparison and abstraction** : If the teacher has performed the first two steps properly, students will see that the new fact have similarities with those already known. Hence in the student consciousness the new and old ideas associate. They are welded together because of their natural affinity for each other. Students should also see the nature of common elements which give the two sets of facts (old and new) their mutual attractiveness. Sorting out this common element is meant by abstraction.

- (iv) **Generalization** : In this step, students generalize or define the principle underlying common elements of two sets of facts ;
- (v) **Application** : Newly learnt principle is used in other situations through assignments etc.

Judd's Ideas of Understanding

According to **Judd**, a generalization is a statement or understanding of relationships. Generalization is another name for the relating of the experiences in such a way that what is gained at one point will rebound to the advantage of the individual in many spheres of thought and action. Judd expects generalizations to bring into action whenever the environment sets the stage for its occurrence.

Judd recognised two kinds of levels of learning; rote memorization with little meaning and generalized knowledge with more intellectual associations. He placed very high premium upon the second and little value on the first level. He advocated that knowledge should always be in such a way that it make some generalization possible. i.e. it should provide possibilities of new associations.

Morrison's idea of promoting understanding level of teaching

Morrison speaks of personality adaptation for explaining the meaning of understanding. An adaptation is a permanent change in personality reflected through behaviour, attitudes and values. It is a change in an organism through which the future will enable it to cope with its environment more effectively. These adaptations may be both in structure and functions.

- (i) **Structural Adaptation** : These refer to changes in structure of organism e.g. animal's eye.
- (ii) **Functional Adaptation** : Changes in behaviour instinctive or learned which help an organism to cope better with its environment.

The business of the teacher is to produce in the students kind of adaptation and the task of education is to create true adaptations instead of adaptive responses.

According to Morrison, understanding leads to generalizations which suggested an if then, relationship i.e. if perform action A then action B is likely to follow. Morrison clarifies his position with an illustration of how a person might come to understand the function of valves in pumps. An understanding is not to memorize the location of valves but to learn the principles governing operation of valves. If he/she knows what valves do in one pump but not in all pumps, he/she will understand the valves no matter what kind of pump is involved.

The outcome of all teaching is mastery not mere memorization of facts. **Mastery is reached only when planned understanding have been grasped thoroughly.** Each subject field is to be divided into 'units'. A unit represents an insight which is relatively complete, in itself. Each unit is developed according to a sequence of steps as follows:

(i) Exploration

- to explore initial learning.
- to arrange subject matter in psychological sequence.
- to decide how to present a unit.

(ii) Presentation

- teacher presents new small units
- diagnoses areas of weakness
- repetition of content

(iii) Assimilation

- Students work in library, laboratory, assignments
- individual work
- supervised activity
- mastery test

(iv) Organisation

- Student reproduce essentials

(v) Recitation

- Student reproduces unit orally.

Bruner's Understanding through conceptualization

Bruner points out that understanding results through conceptualizing or categorizing hodge podge received facts. Human beings have a remarkable capacity to discriminate object in their environment. For a person to make any sense out of his environment, he/she must be able to select, from an infinite number of discriminate objects, and events, those which appear to have something in common, and to treat these as a single category e.g. we put all colours into one category of colour. We categories people by social class, religious affiliation, nationality, size of group, age, etc.)categorization and conceptualization have been used synonymously by Bruner).

There are two types of categories, namely identify and equivalent :

(i) Identity Category : Putting a number of different variations of the same object into one intellectual barrel, e.g. all visible crescents of full moon being all 'moon'.

(ii) Equivalent Category : Different kinds of objects seen as related to one another. There are three different equivalent categories.

(a) Affective equivalent categories

Different objects of environment which evoke the same emotional response e.g. nightmares, being lost in wildness, most terrifying experience.

(b) Functional equivalent categories

When one puts different objects into the same barrel, i.e. fruit (apple, mango etc.)

(c) Formal equivalence categories

When a person deliberately specifies a strategy in which he selected by

considering the following three factors :

- (i) Informational situations (Basic amount of information already in possession of person.
- (ii) Cognitive strain (State of high anxiety to achieve goals).
- (iii) Risk (external of willingness to assume risk).

Process of teaching at Understanding level

To teach effectively at understanding level, teacher must :

- (i) Keep his/her objectives clear;
- (ii) understanding the proper role of practice;
- (iii) practice productive motivational techniques;
- (iv) pace students and lessons advantageously; and
- (v) use lesson plans properly.

(i) Keeping objectives clear : Most students made an effort to learn whatever a teacher announces to them. Before the learning act, the students should be explained the kind of learning they are expected to achieve. Students must be taught, the nature of a concept, a generalization and a structured subject.

(ii) Role of Practice : Practice is often necessary to achieve a learning task. However, there is difference between mechanical repetition and experimental practice, that is, with practice subject performs the act a little differently each time and observes or experiences the consequences. Bruner maintains that general learning cannot occur in the absence of a changing situation.

(iii) Productive Motivation : Like others before him whose chief focus was on teaching for understanding. Bruner does not come to grips with the problem of including students who want to involve themselves in study. Teaching which does not go beyond the objectives of helping students see the relatedness of things, seeks motivation from wherever it can be found. Motivation is one area in which Bruner does not have much to say.

(iv) Pacing advantageously : It is a speed of movement from one topic to another. The pace of understanding level is usually slow. To achieve genius understanding and consequently to retain and transfer it may eliminate half or more of the present curriculum.

(v) Proper use of lessons plans : Until a teacher has structured his subject matter in his own thinking he not only should read and think copiously but also should take notes which can be translated into lesson plans as necessary. Herbart gave rigid lesson-planning. Morrison's mastery unit represent an advances over Herbartain lesson-plans. Bruner appears to have nothing to say on the subject of lesson-plans. Possibly he assumes that a competent teacher will have his lesson-plans in his head.

1.3.5 Teaching at Reflective Level

Reflective level teaching is problem-centered in which solutions are carried over in and

outside school. It is a teacher (mutual) inquiry within which genuine problems are developed and solved. Reflective level of teaching requires on the part of students more active participation, more criticism of conventional thinking and more imagination and creativeness. It leads to development of classroom atmosphere which is more alive and exciting, more critical and penetrating and more open to fresh and original thinking.

Reflective level of teaching involves.

- (1) Problem raising.
- (2) Problem solving

(1) Problem Raising

The instruction at this level begin with a problematic situation. But the problem should be so compelling that the subject want to work upon it and should not be confusing that the students want to give up. The problem should be a real problem in the psychological sense. It must involve psychological tension in a teacher. A problem should be felt by the learner himself, otherwise, there will not be any motivation to solve it. Problems in which students are personally involved are different from societal problems which represent social needs, and which some adults believe, exists in a community, region or nation. The problems unless felt personally by students remain, in their foreign hull.

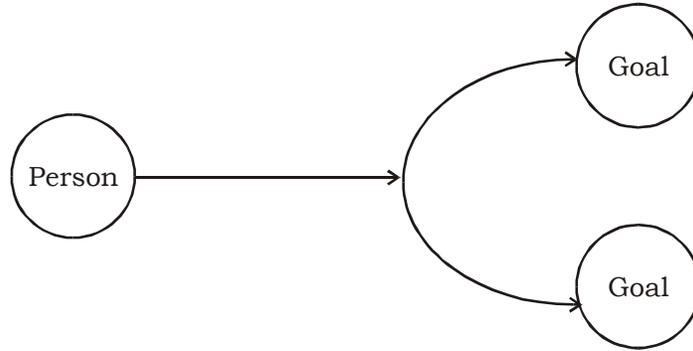
Problematic Situations

As a basic requisite to have a problem, a person must have a goal. Problem arises because of some type of hindrance in moving quickly and directly to a goal. Not achieving goal readily may be because there are more than one alluring goals and a person is unable to chose one or other seems to be no path to achieve the goal. These problematic situations have been described by John Dewey as :

- (i) No path situation



- (ii) Conflicting-path situations :
 - (a) Forked path situation A :
(Two equally attractive goals)

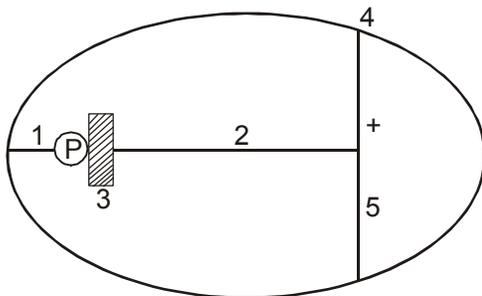


(b) Forked path Situation B
(Two equally attractive paths)

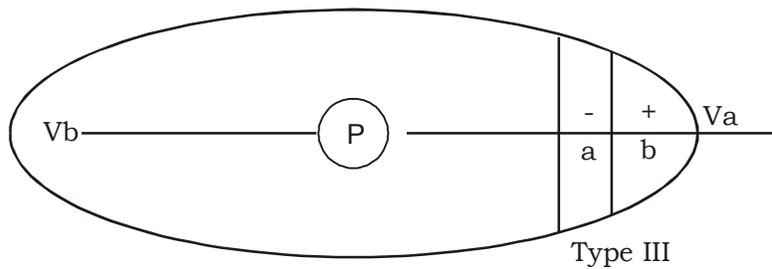
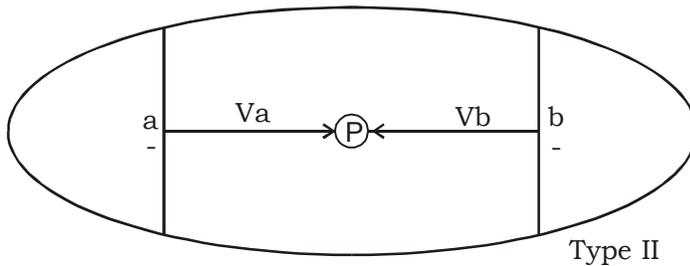
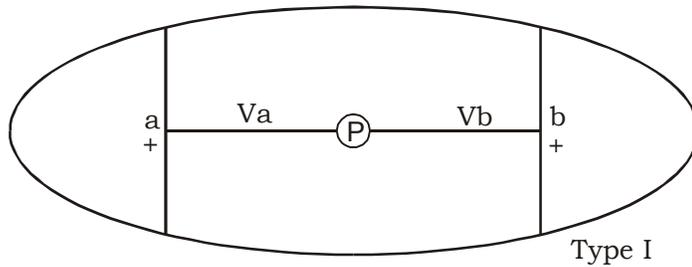


Problematic situations defined in Lewinian terms
No path situation

- P = Person
- 1 = Vector of driving force towards goals.
- 2 = Vector of restraining force of barrier.
- 3 = Barrier
- 4 = Psychological environment
- 5 = Goal (Region of Positive valence)



approach-approach conflict



Level of tension created by any of the above situation depends upon the following factors :

- i) Desirability of the goal / goals.
- ii) apparent difficulty of the obstacle.
- iii) his / her own personality make-up.

Techniques of raising problems in class-room

For a student, problem arises when there appears uncertainty regarding present attitudes, values, beliefs of knowledge, he feels dissatisfied and the goal of learning becomes a desire to remove doubt.

A skillful teacher creates such situation by :

- i) leading student to see that he holds contradictory attitude, beliefs or items of knowledge of making him aware of his behavioural inconsistencies ;
- ii) exposing contradictions and loopholes in student's thinking.
- iii) introducing students to data from outside their life space which have the effect of making them doubt some attitudes, values beliefs of supposed items of knowledge.

The teacher may ask students to :

- Read a book
 - watch a T.V.programme
 - watch motion picture
 - go on a field trip etc.
 - do any other activity that confronts them with facts contrary to what they have taken for granted.
- iv) provide opportunity to make 'problem-raising' mistakes without endangering anyone. Problem centred teaching does not end with introduction of psychological tensions. This aspect provides motivation and direction for the problem solving aspect of reflective inquiry. Here, with introduction of doubt, reflective teaching enters into its second important step i.e. problem solving.

(2) Problem Solving

Problem solving proceeds by :

- i) encouraging students to formulate as many hypotheses as possible which might resolve discrepancies in thought.
- ii) making students formulate negative hypotheses, answering of which solves the problems;
- iii) insisting students to examine hypotheses in the light of pertinent evidence;
- iv) helping students arrive at conclusions towards the end of the problem centred study. Conclusions may involve either;
 - re-acceptance of idea originally brought under question or
 - modification of the idea or
 - formulation of a substituted theme.

There are two major concerns of reflective level of teaching;

- (a) Thoroughness;
- (b) Orderliness

Thoroughness and reflective teaching

- i) While raising a problematic situation a teacher might need to make several false starts. When one plan fails to create tension, he tries another until he hits at the one that works. So there cannot be a fixed time limit for problem-centred teaching.
- ii) The length of time the students struggle with problem depends upon their age and maturity.
- iii) Law of diminishing returns' operates in education i.e. a time is reached when further pursuit of a problem will not be worth the time and effort involved. Other equally important may be pressing for attention.
- iv) Teacher must be free from the dictate of standard printed guides.

Orderliness and reflective teaching

Reflective-level of teaching is rarely as orderly as written description of it imply. Problem

is raised hypotheses are formulated, evidences are stated, conclusions are suggested but rarely in one-two three fashion. A student back and forth from problem of hypotheses to conclusion in varying orders.

Teacher, however, presides over such discussions in such a way as to see that appropriate question to get asked, that important hypotheses are not ignored, that conclusions are presented and discussed.

In schools, problem-centred teaching may involve.

- i) individual or group research;
- ii) home study;
- iii) trips;
- iv) guest speakers;

The environment of a class of reflective learning should be such that

- i) each student is involved into the issue;
- ii) students do not face frustration during teaching process.
- iii) a child feels secure.
- iv) there is warmth in the group.
- v) considerable permissiveness is allowed.

A teacher can create such an environment through following techniques :

- a) encouraging group membership;
- b) reducing threat and promoting open-mindedness;
- c) practising democratic group leadership;
- d) fostering group decisions.

(a) Group membership

'Students drop prejudices if he/she is a member of group which is making some change' together. Teacher can group students on the basis of :

- cliques ;
- religious / social class affiliations ;
- racial grouping ;
- grouping on the basis of achievement.

But, to avoid social isolation on the part of some students and to compensate for the lack of group spirit, appropriate measures should be taken :

- to establish group feeling, regroup students every time so that each student works with every other student.
- a student who feels he is a member of a group, where he fits, he feels secure.

(b) Promoting open mindedness and reducing threat

Provides complete freedom of expression to do this ;
all serious ideas of students be respected and accepted by the teacher.

(c) Practising democratic group leadership

The nature of a democratic group is such that it is self-government and decisions

are arrived at by consensus or by votes. Each member of a democratic group provides opportunities of intercommunication among members. Functioning of the group is viewed objectively by democratic leaders. Shared responsibilities are bestowed. It provided an atmosphere in which a student can think clearly and creative choice.

(d) Fostering group decisions

In spite of close rapport, group do not change beliefs automatically. A teacher or group members may help to remove counter forces. An individual without exerting to explore a problem independently, feeling no authoritarian pressure from above to explore it in a particular way or emerge with particular conclusions, they are much more likely than otherwise to undergo real and permanent changes in conceptual patterns. Teacher may only suggest directions for exploration.

Applicability of reflective level (R.L.) of teaching

Some course and types of course organization lend themselves more readily to R.L. teaching than do others. Essential characteristics of R.L. teaching have enough flexibility to be employed in all school subjects, even those subjects, which seem on the surface to be dry. Passages in a textbook, assertions made by students new story motion picture etc. may serve as a spring board for creation of problems.

Real problems are psychological and the causes, therefore cannot be, organised into text books. A course in which problems centred teaching is used cannot be found rigidly to a text book.

Teaching reflective in forbidden area requires intelligence and skill. It may be hampered by :

- teachers' own ignorance or prejudice
- lack of adequate facts;
- pressure from school authorities and community ;

1.3.6 Summary

Along a continuum, which ranges from most thoughtless to the most thoughtful. learning situations, reflective level learning situations is the most thoughtful.

Teaching at memory level is simply committing factual material to memory. This factual material may be meaningful for entirely non-sensical. Capacity to retain material does not seem to have any positive relationship with intelligence. A genius may be forgetful and imbeciles could memorize remarkable. It however, bears an indirect relationship with memory level learning i.e. memorized facts become pertinent on occasion of problem solving. A teacher is an authoritarian one when he is teaching at memory level. He exercises firm and centralized control. Evaluation at memory level is done through items measuring simply recall and recognition.

Understanding can be defined in three way viz. as seeing relationship, as seeing tool

use of a fact, as seeing both relationship and tool use. According to Herbart, understanding occurs through apperceptive mass and learning process through ordered steps viz. preparation, presumption, presentation, comparison, generalization and application. **Judd** assumes that understanding occurs through conflict generalizations. **Morrison** speaks of personality of all teaching is mastery of units. Each unit developed according to a sequence of steps viz. exploration, presentation, assimilation, organization and recitation.

Bruner points out that for understanding results through categorization of perceived facts, there are two basic types of categories; namely, identity and equivalent. The process of categorisation depends upon informational situation, cognitive strain and risk. Coding is a set of contingently related non-specific categories. More generalized a coding system, more useful it is to a learner (because of its structure.)

Reflective level of teaching involves :

- i) Problem raising ;
- ii) Problem solving ;

Problematic situation, may be defined in **Dewey's or Lewin's terms**. Whatever be the problematic situation, it can be made felt by pointing out to contradictory attitudes, beliefs, or by subject matter switch or by introducing disturbing data. Problem solving proceeds by formulating hypotheses, and arriving at conclusion. Thoroughness and orderliness are two major concerns of problem solving teaching.

A teacher can create reflective level learning environment by encouraging group memberships, promoting open mindedness, practising democratic group leadership and group decisions.

1.3.7 SUGGESTED QUESTIONS

1. Discuss memory level teaching and explain its relationship with learning and intelligence.
2. Describe process of understanding level of teaching and exemplify each step.
3. What are the different forms of problematic situation? What is reflective level of teaching? How will you organise reflective of teaching ?

1.3.8 SUGGESTED READING

1. Bhushan, A & Ahuja M, : Educational Technology, Vivek Publishers, Meenakshi Puran, Meerut, 1922.
2. "Psychological Foundations of Education", by Bigge and Hunt.
3. "Learning Theories" by Hilgard.
4. "The Activities of Teachings" by Thomas E. Green.
5. "Strategies of Teaching" by Paul D. Eggen & others.

Objective Specifications: Educational and Instructional Objectives, Writing Instructional Objectives

Structure of the Lesson

- 1.4.1 Objectives
- 1.4.2 Introduction
- 1.4.3 Meaning of Objectives
- 1.4.4 Specification of Objectives
- 1.4.5 Educational Objectives
- 1.4.6 Taxonomy of Educational and Instructional Objectives
- 1.4.7 Suggested Reading

1.4.1 Objectives : Students will be able to -

- (i) define objective
- (ii) explain specification of objectives
- (iii) define educational objectives
- (iv) explain taxonomy of Educational and instructional objective.

1.4.2 Introduction

The process of education involves three steps – (1) determining objectives, (2) providing experiences designed to achieve the objectives and (3) measuring and evaluating the results to determine if the objectives have been achieved. During planning of teaching, the learning objectives should be written in clear terms so that it can be explored what behavioural changes in what areas of the pupils are to be brought about.

Teaching is a purposeful and meaningful process. A teacher has a delimited set of objectives. The teaching objectives are identified often by analysing the content to be taught. These are determined in planning step. The teacher can identify his teaching objectives with the help of his knowledge and understanding of educational objectives. Specification means atomising the objective by defining them in operational terms. It provides an insight into the whole teaching learning process. Specification identifies the testable objectives.

1.4.3 Meaning of Objectives :

An objective is a normative concept which carries with it the idea of goodness or the desirable. What is desirable, depends on what we consider good for the learner. Thus what an individual or learner do we visualise as a result of having educated him through the instructional programme. This means particular types of behaviours or desirable changes that we can expect our students to acquire after undergoing education. It is those intended changes or learning outcomes or expected modes of

behaviours that we like to appraise also in the pupils in order to judge the effectiveness of the educational process. The intended product of learning and not the content of learning is reflected in an objective.

An objective refers to values which are judged as desirable and are given priority for transmission through the educational process, yet it is not a value by itself. It is a product of value judgement. Likewise, an activity content, a learning situation or an experience of a process of learning, the medium of learning etc. are all means towards attainments or expected learning outcomes but are themselves not the end product of learning. Thus an objective is concerned with the learning rather than with the process of learning. An objective represents the end point toward which activities are directed. They reflect the purposefulness of the teaching learning process. Goals and objectives are often used synonymously. However, educationists, planners and evaluators use the term 'goal' as a general statement of desired outcomes, aims or purpose having long-range implications and involving complex behaviours. They are useful in stating the purpose of education, purposes of curriculum to assess a viewpoint, in identifying priorities for a policy statement and to communicate with the layman. Statement of goals helps the teachers in communication of programme goals to administrators, students and parents besides conceptualising the desired outcomes in proper perspective i.e. Objectives indicate intended learning outcomes at different levels thereby providing direction to pupils' growth. They provide a basis for planning and organisation of the learning experience and selection of an evaluation instrument. It is through objective that a link is established between teachers, evaluators, parents and students by focussing their attention on the intended product of learning. The teaching objectives are identified after analysing the content to be taught because teaching is a meaningful and purposeful activity. The teaching objectives are determined in the planning step. The teacher can identify his teaching objectives with the help of his knowledge and understanding of educational objectives. The objective is statement or a form of category which suggests any kind of change. The objective has the following characteristics

- (a) It provides the direction for the activity, which is designed for achieving the ultimate goal.
- (b) It helps for the planned change.
- (c) It provides the basis of organizing activities.

1.4.4 Specification of Objectives

The specification of objectives is primarily meant by visualising the scope and nature of each objective. It helps the teachers and evaluators to focus their attention on the terminal behaviour of students. It is intended learning outcomes that becomes the basis for evaluation as well as instruction. As far as testing is concerned, it is almost imperative that the testing situation should be so selected as to cover all these behaviours or learning outcome or at least adequate sample of those behaviours. Each of these behaviours can be tested singly or in combination of two's or three's as we normally do by using essay-type questions. Such a possibility of testing learning outcomes one by one is quite desirable, especially when we are

interested in diagnosis of pupils weakness and providing remedial instructions to improve their achievement.

On the other hand it should not be considered that teaching can also be done one to one basis. For example, it is quite ridiculous to say, "I am now teaching for interpretation, then for analysis and then for developing ability to hypothesis". If we purposely do this, it means that we teach for a behaviour and test for that behaviour. We teach for another behaviour followed by testing for the same behaviour. Obviously, If we do that we are teaching at a low level. In reality this is not the case. Teaching is an integrated act. It is neither possible nor desirable to visualize that a teacher is teaching for one particular objective for ten minutes, for the second objective for five minutes and so on. This is not the intent of specifying objectives in behavioural terms. What is needed is to appreciate the relationship between objectives, teaching or learning and testing. An examination is a sampling process while teaching is an integrative process. But what is worth realisation to the objective based teaching and objective-based testing so that the one could be related to the realisation of objectives and the other to the testing for those objectives. Specification means atomising the objectives by defining them in operational terms. More often than not, the focus of teaching remains more on the subject content than on the child's overt behaviour. What the child does in a subject, the subject does to the child in the form of bringing about changes in his behaviour. If the objectives are specified in terms of intended pupil's behaviour which are listed as specifications under each objective, it serves a number of purposes like the following

1. It makes the **goal clear** by delimiting the scope of each objective.
2. It helps to **identify the objective** which are testable and those which are not testable.
3. It facilitates **identification and organisation** of teachable and learnable elements to the objectives.
4. It helps in deciding instructional strategies and selection of instructional material in terms of clearly defined outcomes.
5. It provides a **basis for selection** and **application** of evaluation procedure to judge instructional outcomes.
6. It helps to **communicate more effectively the desired outcomes** of instruction to students, parents and administrators.
7. It improves the **accountability** operations of a programme project.
8. It facilitates the **policy-planning** and the **decision making process** because of more adequate data on the strengths and weaknesses of instructional efforts.
9. It reflects better the **individual needs** of students and **special needs** of different groups of students.

In fact, specification of objectives provides an insight into the whole teaching learning process.

1.4.5 Educational Objectives

The educational objectives imply the changes that we try to produce in the child.

The educational objectives are generally in the statement form. These are broad and philosophical in nature while the teaching objectives are specific and psychological in nature. The teaching strategies and tactics are selected on the basis of teaching learning objectives. When the list of specific objectives is prepared it may run into hundreds in a particular subject. It is therefore, essential that selection must be made on the basis of some criteria agreed upon by the specialists in the field. Following criteria may be useful for the selection of objectives :

1. Objectives should be worthwhile and have educational significance.
2. They should agree with the broader goals of education.
3. They should be in accordance with the psychology of learning.
4. They should be comprehensive enough to cover all areas of human development.
5. They should be attainable under the school conditions.
6. They should be testable in terms of observable and verifiable changes.
7. They should be acceptable to teachers from our stand point of teaching resources, availability of time and instruction.

The educational objectives are borad and they are related to educational systems and schools. The educational objectives are achieved with the help of teaching or learning objectives. The definition of educational objectives may be achieved in long period. B.S. Bloom has given a very comprehensive definition of educational objectives. "Educational objectives are not only the goals towards which the curriculum is shaped and towards which instruction is guided, but they are also the goals that provide the detailed specification for the construction and use of evaluative technique".

Bloom's taxonomy (1959) is based on four basic postulates;

- (i) Behaviours designed in the taxonomy are cognitive.
- (ii) Behaviours are hierarchical in nature.
- (iii) Behaviours are cummulative in nature.
- (iv) Behaviours are learned behaviours.

Bloom's taxonomy is arranged into six objectives.

- (i) Knowledge
- (ii) Comprehension
- (iii) Application
- (iv) Analysis
- (v) Synthesis
- (vi) Evaluation

Each of the above objectives is further divided into sub-categories. As objective of knowledge includes-knowledge of specifics and of ways and means of dealing with specifics and knowledge of universals and abstraction in a field, comprehension includes-Translation, Interpretation and Extrapolation. Application includes ability to use a theory, principle of a method to solve a problem involving a new or unfamiliar

situation. Analysis means analysis of elements, relationships and of organisational principles. Synthesis has subcategories as :

Instructional objectives

Instructional objectives are intended learning outcomes towards which pupils progress. They are the end results of learning stated in terms of changes in pupil behaviour. An increase in knowledge, a broadening of understanding, an improvement in a physical skill, a shifting of attitude and a deepening of appreciation are all classified as changes in behaviour. Learning outcomes can generally be divided into those that provide for maximum individual development. The mastery outcomes are typically concerned with the minimum essentials of course, that is, with those learning tasks that must be mastered if the pupil is to be successful at the next level of instruction. The developmental outcomes are concerned with those objectives that can never be fully achieved. Mastery objectives are typically concerned with relatively simple knowledge and skill outcomes.

Instructional objectives at the development level are typically concerned with the more complex learning outcomes (e.g., understanding, application, thinking skills). Thus, each general instructional objectives tends to encompass many more specific learning outcomes than could possibly be listed for it. Mastery objectives are typically concerned with simple learning tasks on which pupils are expected to demonstrate a uniformly high level of performance. These objectives tend to be limited enough in scope that all, or nearly all, intended outcomes can be specified for each objectives.

- (a) Production of a plan or proposed set of operations.
- (b) Production of unique communication
- (c) Derivation of a set of abstract relations.

Evaluation includes judgement in terms of internal and external criteria. Development objectives are concerned with complex outcomes towards to which pupils can be expected to show varying degree of progress. Since these objectives emphasize higher order learning, that stress the transfer of knowledge and skill to new situations, only a sample of the infinite number of possible learning outcomes can be specified for each objectives.

1.4.6 Taxonomy of Educational and Instructional objectives

Instructional objectives are achieved in terms of changes of behaviour of learners. These are specific, direct and practical in nature. Therefore, they are most useful for teachers. They are related to the learning outcomes or change of behaviour of the learner. B.S. Bloom has classified the learning objectives into three domains.

1. Cognitive Domain:

In cognitive domain only those educational objectives are included which are concerned with knowledge, recognition and recall and cater to the development of intellectual abilities and skills.

2. Affective Domain:

In affective domain only those educational objectives are included which are related to the domain of interests, attitudes and values and bring desirable changes in the same. The weakness of these objectives is that they cannot be stated in terminal behaviour, because they are related only to inner feelings and emotions.

3. Psycho-motor domain:

This domain helps in the development of skill. Training of physical activities is the main part of this domain.

Writing Instructional Objectives:

The task of preparing instructional objectives can be simplified, if we constantly observe expected outcomes of teaching-learning situations. We are not identifying subject matter of content but the reaction of the pupils are to be made for this content. We have to note changes in pupil's behaviour resulting from experiences likewise, we have to list the expected results of instruction and not describing what we intend to do during instruction.

Writing objectives means to note down the changes in pupils behaviour during teaching learning process. So it is beneficial to define our instructional objectives in terms of learning outcomes. The main advantages of writing objectives in behavioural terms are:

1. Teaching activities are determined.
2. Teaching and learning process may be integrated for effective learning outcomes.
3. Teaching and testing can be made objective-centered.
4. The appropriate teaching strategies and tactics can be selected for effective learning.

In developing a list of objectives for a course of study, we have two immediate goals in mind. One is to obtain a list of instructional objectives. The other is to state these objectives so that they clearly indicate the learning outcomes that we expect from the course.

1. Identification of Instructional Objectives:

Identification of general instructional objectives for any course of study includes:

- (i) To identify the general purpose of the course and analyse each purpose of the course into definite statement of general instructional objectives.
- (ii) To analyse the content of the course and add the instructional objectives suggested by content analysis.
- (iii) Addition of instructional objectives resulting primarily from methods of instruction by examining the teaching methods.
- (iv) Consult experts for making list of objectives and add those instructional objectives that are be sure that all important `outcomes have been included.

2. Stating the general instructional objectives:

- (i) State the general instructional objectives as intended learning outcomes and include only one objective in each statement.
- (ii) State the general instructional objectives so that each encompasses a class of behaviour that can be further defined by a set of behaviourally stated learning outcome and group the objectives in terms of type of learning outcome indicated by each objective.

3. Defining the general instructional objectives:

- (i) List a representative sample of the specific learning outcome that characterize the attainment of each objective.
- (ii) State the specific learning outcomes in terms of observable components of those concepts that are lacking common meaning.

In defining instructional objectives, it is, of course, impossible to list all specific learning outcomes that characterize the attainment of each general instructional objective. However, enough should be listed for each objective to clarify the typical behaviour of pupils who have satisfactorily achieved the objective. When instructional objectives are viewed as outcomes and are defined in behavioural terms numerous types of behavioural changes might be included. In addition to the more obvious knowledge outcomes, those in areas of understanding, application, thinking skill, performance skills, attitudes, interests, appreciation, and adjustment should also be considered. Although our emphasis has been on the process of preparing instructional objectives, the adequacy of the final list of objectives can be appraised in terms of the extent to which it includes all important outcomes of the course, it is in harmony with sound principles of learning. It is realistic in terms of the abilities of the pupils and the time and facilities available and it clearly indicates the intended learning outcomes in terms of changes in pupil behaviour. No matter how comprehensive a set of instructional objectives may be, however, there are likely to be some unanticipated outcomes of instruction.

Methods of Writing, Instructional Objective in Behavioural Terms :

There are various methods of writing of objectives in behavioural items. It has five historical basis:

1. Drucker (1954) advocated that the activities of management should be explained in terms of objectives. He emphasized the behavioural aspects of the objective.
2. B.S. Bloom (1956)- emphasize objectives in examination system inspite of content. He suggested that in examination system achievement tests should be objective-centred rather than content-centred. Thus, he made an effort to write these objectives in behavioural terms.
3. Robert Mager's Approach (1962) is most popular in the development of programmed instruction. In this approach he gives emphasis on action verbs rather than mental processes. The cognitive objectives can best be realised by programmed instruction strategy. He considers that the behavioural objectives can be written in following manner :
 - (i) Identify the terminal behaviour by name.
 - (ii) Describe the important conditions under which the behaviour is expected to occur.
 - (iii) Specify the criteria of acceptable performance by describing how well the learner must perform to be considered acceptable.

4. Robert Miller's Approach (1962) is used for writing psychomotor objectives in behavioural approach. The origin of this approach is from the military science. Thus, the training objective can be best written by Miller's approach.

In this approach, he emphasised skill analysis. He outlined the following procedure for writing psychomotor objectives in behavioural terms :

- (i) Description of the indicator, indicating the relevant or essential activity.
- (ii) Description of indication or stimulus which calls for a response.
- (iii) Controlling of the object which is to be attended.
- (iv) Writing or description of the activity to be performed.
- (v) Indication of the response should be adequate or feedback.

Miller points out that a specific objective written with above procedure can be used as an action manual.

5. NCERT (1972) (Regional College of Education Mysore-RCEM) also developed an approach for writing objectives in behavioural terms. This approach is applicable for cognitive objectives and psychomotor objectives of teaching and training.

The assumption of this approach is that human learning can be best explained in terms of mental process or mental abilities rather than behaviour. This approach is a modified form of Bloom's Taxonomy. Bloom has given six categories of objectives but RCEM has given four categories. These four categories have been further divided into 17 mental process or abilities. These abilities or processes are used for writing the objectives of cognitive, affective and psychomotor objectives in behavioural terms as follows :

1. Knowledge Objective :

- 1.1 The learner will be able to recognize.....
- 1.2 The learner will be able to recall.....

2. Understanding Objectives :

- 2.1 The learner will be able to see relationship between.....and.....
- 2.2 The learner will be able to cite example of.....
- 2.3 The learner will be able to classify.....
- 2.4 The learner will be able to verify.....
- 2.5 The learner will be able to generalize.....
- 2.6 The learner will be able to interpret.....

3. Application Objectives :

- 3.1 The learner will be able to reason out.....
- 3.2 The learner will be able to formulate hypothesis for

- 3.3 The learner will be able to establish hypothesis for
- 3.4 The learner will be able to infer about
- 3.5 The learner will be able to predict about.....

4. Creativity Objectives :

- 4.1 The learner will be able to analyze
- 4.2 The learner will be able to synthesize
- 4.3 The learner will be able to evaluate

4.7 SUGGESTED READINGS

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