**Self-Learning Material**

# Education

# Course –Edu: 201

# Educational Technology

## Directorate of Open and Distance Learning

## Dibrugarh University

# Block-I: CONCEPT OF EDUCATIONAL TECHNOLOGY

## Unit-1: Components of Educational Technology, Hardware, Software; Educational Technology as the Systems Approach to Education

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## 1.0 Objectives

After going through this unit, you will be able to:

- Define Educational Technology and explain its concept.
- Discuss the history of Educational Technology briefly.
- Discuss the characteristics of Educational Technology
- List and exemplify the components of Educational Technology.
- Discuss the scope of Educational Technology
- List and illustrate the approaches of Educational Technology
- Analyze the concept of Systems Approach
- Exemplify the steps, characteristics, advantages and limitations and purpose of Systems Approach.

## 1.1 Introduction

Hello learners, can you think of doing something or living a day without technology? No, you cannot. The present era is the era of Science and Technology; consequently every aspects of human life are influenced by Science and Technology. Accordingly, it brings changes in the field of Education too. The increasing use of technology like Radio, Tape-recorder, Television, LCD projectors, Computer, Mobile phone etc. changes the whole educational scenario in diverse ways and also at various levels. All the aspects of education like aims and objectives, media, methods and techniques of education, teaching-learning process or research process, all are dependent on technology.

Learners, as we all know the term Educational Technology is combination of two terms-education and technology. In this unit, first we will discuss both the terms separately then will consider the meaning of Educational Technology so that you can understand the concept in a better way. We will also provide to you a brief history of this comparatively new discipline of Education. After studying this unit, you will also learn how the various components –media, materials, methods, manpower work together to achieve predetermined educational objectives. Moreover, we will discuss the scope and the three approaches of Educational Technology. Lastly, you will learn how systems approach to education can make any educational system more efficient and effective.

Learners, we hope you will enjoy learning this unit. After most of the sub-section, you will get some Check Your Progress (CYP) questions, please attempt those before proceed to next sub-section. **(time ?)**

## 1.2 Concept of Educational Technology

We are all using technology in our day–to-day life to make our life, our way of living easier and more effective. To the general people, the term 'educational technology' means the equipment and the electronic gadgets viz. overhead projector (OHP), television, computer etc. But it has a wider meaning. The term "*Educational Technology"* is combination of two words- Education and Technology. Both of the terms are most commonly and frequently used. Although you are all accustom with the term education, here we will first discuss the meaning of these two terms separately as meaning of these two terms are very broad and have several meanings. Then we will look at the meaning of the term Educational Technology.

❖ **Meaning of Education:**

The term education has been defined in many ways. Some of the common and important meanings of education are given below:

- Education is a lifelong process, all total of our experiences.
- Education is a process of development; it is for all round development of the child.
- Education is as a teacher training, Teacher Education
- Education is an independent field of study, as discipline.
- Education is an investment.
- Education is an instrument of cultural and social change, and social control.

The above meanings of Education provide an idea of Education. Besides, a comprehensive understanding of the term Education is possible, if we try to answer the questions-

- Why to teach?
- What to teach?
- How to teach?

The first question, "why to teach" can be answered by the philosophers, and aims and objectives of education are based on this answer. The question "what to teach" can be answered by the sociologist i.e. needs and values of the society and this answer leads to content and curriculum of teaching. Finally the question, "how to teach" can be answered by the psychologist and answers to this questions provide the methods and techniques of teaching. These methods and techniques of teaching are very close to technology.

❖ **Meaning of Technology:**

This word 'technology' is originated from the Greek word *technología*, which means an art, and is

related to skill and agility. Generally, the term 'technology' denotes the systematic application of the scientific principles to practical tasks in industry. Technology can refer to machinery or hardware and also embraces systems, methods of organization and techniques.

Technology does not produce anything by itself; it increases the efficiency of a system. It is the use of machines for improvement of our work. The use of machine makes our tasks effective and efficient. That is why it is called "Extension of Man".

Technology is of two different types- technology as **things** and technology as **social process** or **human activity** (Naughton, 1968). The application of scientific knowledge to practical tasks is the **Technology as Things** and the application of scientific and other organized knowledge to practical tasks by hierarchically ordered system is **Technology as Social Process.** Thus, technology, on the one hand, creates/ develops new models, designs, methods, techniques and on the other hand, it organizes human and machines logically and rationally. So, it is not only a tool for scientific development, but also it can change the society.

Mr. Grath has stated that in the field of education, technology includes the methods and strategies of teaching, mechanical and electronic devices/ instruments, media equipment's, library inventories and text books. According to Garrison (1989): 'Technology will be viewed here as having both, a process (software) and a product (hardware) component, where process is the creative application of knowledge of purposeful activities. A subset of hardware is media, where media are the devices used to distribute information'. Thus, educational technology is a wider concept of the word 'technology'.

**1.2.1. Brief History of Educational Technology:** Brynmor Jones of England used the term *Educational Technology* for the first time in the year 1967. After that in one of its conference, National Council of Educational Technology (NCET) of England analyzed this term and gradually it achieves the status as a branch of Education like other branches viz. Educational Philosophy, Educational Psychology, Educational Sociology and so on.

Due to Industrial revolution in the beginning of nineteenth century, men were replaced by machines in different sectors. Consequently, experiments and changes were also under taken in the field of education. Sidney Pressey of University of Ohio, USA invented Teaching machine and used in teaching in the year 1926. Specific types of scrambled books, cards, blocks etc. were also used by some other educationist like Lumsdain and Glaser. However, there were no significant changes or impacts in the field of education as a result of those educational tools till 1950. In the year 1950 B.F. Skinner developed Programme Learning Material's (PLM's) and accordingly due to the efforts of Skinner, Stanley Edward etc. educational games and tools became popular in

different countries. Gradually, technology occupied a significant place in the field of education; Programme Learning/ Instruction, audio visual aids, educational games became integral parts of the educational transaction and all these tools and techniques of education were acknowledged as Educational Technology. As the time passes by, teaching models, new innovations were adjoined to Educational Technology and it is become capable of making the teaching-learning process more effective, more efficient and more fruitful.

**1.2.2. Definition of Educational Technology**:

Learners, different groups, organizations and individuals have defined 'educational technology' in many ways, over a period of time. Let us now look into some of them:

1. According to Finn (1962), 'educational technology is a process, an attitude, a way of thinking about certain classes of problems.
2. Lumsden (1964) had given two meanings of educational technology. They are Educational Technology-I (ET-1) and Educational Technology- II (ET-II). ET-I means the application of principles of engineering in the process of teaching. ET- II refers to the application of behavioral science to improve instruction.
3. The National Council for Educational Technology (1967) has defined educational technology as 'the development, application and evaluation of systems, techniques and aids to improve the process of human learning'.
4. G.O.M. Leith( 1967)defines **Educational technology as "**"Educational Technology is the systematic application of scientific knowledge about teaching-learning and conditions of learning to improve the efficiency of teaching and training ."
5. S.S. Kulkarni(1969): "Educational Technology can be defined as the application of the laws as well as recent discoveries of science and technology to the process of education".
6. According to D. Unwin,( 1969 )'educational technology is concerned with the application of modern skills and techniques to the requirements of education and training. This includes the facilitation of learning by manipulation of media and methods and the control of environment in so far as this reflects on learning'.
7. The Association for Educational Communication and Technology, AECT (1977), defines educational technology as "a complex and integrated process, involving people, procedures, ideas, devices and organization, for analyzing problems and devising, implementing, evaluating and managing solutions to those problems, involved in all

aspects of human learning".

8. Mitchell (1978) has given five fundamental definitions of educational technology. They are-

   a. **Educational technology I (educational psycho technology):** This ET refers to the application of different psycho technology to enhance a learner's capability by manipulating sensory input directly or indirectly.

   b. **Educational technology II (educational information and communications technology):** this category means the model, manufacture and assessment of training resources and communications for local or widespread distribution. Focus is on generating, selecting, processing and storage of information for the purpose of education and to retrieve information. This is to make knowledge more accessible and closely related to the role of education materials provider.

   c. **Educational technology III (educational management technology):** This definition emphasizes on organization of educational resources or management of learning resources. These resources include associated activities like planning, organizing, budgeting, management, decision-making, operations research and system analysis. Organizational technology provides useful decision modes, information systems and organizational theory for man-machine systems.

   d. **Educational technology IV (educational system technology):** This concerns with the functions like setting up, outlining, constructing and evaluating educational systems. So, this is related to administration, operations, extra-mural and alternative educational systems.

   e. **Educational technology V (educational planning technology):** This meaning refers to planning at the supra- institutional or national level and non-educators deal with this field. The educational planners seek for alternative opportunities of education based on economic factors.

9. In NPE (1986), the definition of Educational technology was given as "the means to reach large numbers in remote and inaccessible areas, remove disparity in educational facilities available to the disadvantaged, and provide individualized instruction to learners conveniently suited to their needs and pace of learning".

10. UNESCO (2001) defines Educational technology as "a communication process resulting from the application of scientific methods to the behavioral science of teaching and

learning. This communication may or may not require the use of media such as television broadcasts, radio, cassettes etc."

11. In the National Curriculum Framework, (2005), educational technology was defined as "the efficient organization of any learning system, adapting or adopting methods, processes and products, to serve identified educational goals".
12. According to Januszewski and Molenda (2008) educational technology is '…the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources
13. According to Mangal and Mangal (2010) -Educational technology should stand for a wise application of available human and non-human resources for providing appropriate solutions to educational problems and to improve the process and products of education'.

### 1.2.3. Characteristics of Educational Technology

Learners, in the above definitions, you have found that there are wide differences among the definitions of educational technology given by various theorists and practitioners. These definitions cover a wide range of activities of educational technology; from the methods of psychology of teaching-learning process to information and communication, and also the various techniques of mass technology.

Let us now record some characteristics of Educational Technology:

1. It is the systematic application of science and technology to education.
2. It gives importance on development of methods and techniques for effective teaching – learning process.
3. It adds efficiency to the teaching-learning process in the both formal and informal situations.
4. It organizes appropriate learning resources for realizing the goals of education.
5. It focuses on the development of methods and techniques for effective learning and evaluation.
6. It encompasses the complete teaching and learning process and is not limited to specific aspects.
7. It involves input, process and output aspects of education.
8. It is not limited to the usage of audio-visual aids, but also extends to the application of psychological principles and instructional theories for improving the teaching—learning process.

9. It is an important component of educational communication.
10. It facilitates learning by controlling media, methods, resources and environment of learning.

Thus, we may conclude that education technology is the application of technology in the field of education to achieve the goal of education effectively and efficiently. Science and technology finds new things to short out the various issues and obligations in the teaching learning process. These innovations are may be some electronic gadget, may be different methods and techniques of teaching and learning which are based on psychological principles or may be proper organization and management of various teaching learning components.

## Check Your Progress-1

1. Choose the correct option:
    a. The question, **what to teach / how to teach** is very closed to technology.
    b. This word 'technology' is originated from the **Greek/ Latin** word technología.
    c. The use of machine makes our tasks effective and efficient; it is called **Extension/ Expansion** of Man.
2. Categorize input, process and output in the following activities of an educational institution –a. teaching skills of a teacher,
    b. availability of various media and teaching aids.
    c. previous achievements of the learners
    d. the results of the learners,
    e. taking some steps to maintain good relationship among the learners,
    f. employability of the learners
    g. learning abilities of the learners
3. What are the two different types of Technology?

## 1.3. Components of Educational Technology:

Learners, different educationist suggest in different ways about components of Educational Technology. This is depending on how we perceive the concept of educational technology. Here we will consider two different concepts.

A. We have found that Educational technology is the rational use of suitable technological tools, techniques, resources and processes to facilitate the teaching learning process as well as to improve student performance. On the basis of this concept, we may categorized the

components as :

1. **Methods:** It refers to the various strategies and techniques of teaching –learning system namely Programmed Learning, Team Teaching, Micro Teaching, Personalized System of Instruction, Seminar, Workshop etc.
2. **Materials:** it refers to instructional materials like Self-Learning Materials, programmed textbooks, manuals, guides, texts and other written/print/e-content and on-line materials.
3. **Media:** It refers to use of audio or visual or both audio-visual media. Instruments for media are radio, tape recorders, charts, maps, posters, films, educational television, CD/DVD, you-tube videos as teaching aids to supplement the teaching –learning process and also to make the process more effective.
4. **Man-Power**: A rational and suitable assimilation and application of above three components is must for effective teaching-learning process. This can be done by a teacher or an educational planner or administrator only. He/she controls educational technology in every way, without man all these components will be meaningless.

According to J.C. Aggarwal (2007), Educational Technology is a system of 5 M's-machines, media, materials, methods and men. Machines refer to those instruments that are needed to provide the materials through media. For example, Radio, Tape Recorders are machine for the Audio media, Television and Charts, Maps are the machines for the audio-visual media and visual media respectively. In this context, he added the $5^{th}$ component of Educational Technology as Machine. These five M's are interrelated and they need to work together for the fulfillment of specific educational objectives. As a result, educational technology refers to a comprehensive technology associated with all aspects of the educational institutions such as choice of methods, teaching strategies, selection of adequate/relevant learning resources/materials, use of appropriate teaching aids and applying them judiciously to make the system more efficient, more effective.

B. According to some other educationist, components of Educational Technology concern with the methodological aspects of teaching to achieve educational objectives. In this context they may be devided as follows:

i. Behavioural technology

ii. Instructional technology

iii. Teaching technology.

Learners, the next unit is on instructional technology and teaching technology, so we will have a

detail discussion about these aspects in that. Therefore, we will not elaborate these concepts in this unit.

## Check Your Progress-2

1. According to J.C. Aggarwal what are the different components of Educational Technology?
2. Identify Methods/ Materials/ Media in the following sentences-
    a. To orient the learners on a particular topic a school organizes an orientation programme . (……..)
    b. At present you are studying this SLM. (……..)
    c. At the time of admission, you are getting some CDs/DVDs. (……..)
    d. In this SLM, you are getting some on-line link to acquire more knowledge on some specific content. (……..)

## 1.4 Scope of Educational Technology:

The scope of any subject means the area of study of that subject, its limitation or boundaries. Scope of Educational technology is as wide as the subject education itself. Moreover, the scope of any subject varies as per its concepts, definitions and meaning etc. changes. Thus, scope of educational technology means the area or boundaries within which it works.

As you all know, educational technology is concerned with enhancement of teaching–learning process. It is the application of science and technology in the field of education which aims at optimizing the educational effects by controlling different types of ambiguous variables. Thus, it is a very broad concept that has a wide application. The National Policy on Education (1986) recommends: 'Educational technology will be employed in the spread of useful information, the training and retraining of teachers, to improve quality, sharpen awareness of arts and culture, include abiding values, etc. in both, formal and non-formal sectors. Maximum use will be made of the available infrastructure'.

Learners, now we will mention about scope of Educational technology as discussed by various educationist.

According to S.S. Kulkarni, the scope of educational technology is:

(i) to analyze teaching-learning

(ii) to evaluate the functions of the components of teaching-learning, and

(iii) to interpret these components in such a way that effective results can be achieved.

According to Derek Rowntree, it is concerned with the design and evaluation of curricula and learning experiences and with the problems of implementing and renovating them. Another scholar advocates that scope of educational technology encompass five components; they are- a. Instructional materials, b. Audio-visual aids, c. Instructional aids, d. Instructional media and e. Instructional technology. According to another scholar it is related to educational administration, educational testing and instructional process. Thus scope of educational technology varies from scholars to scholars and according to its changing meaning, concept and utility. Learners, in narrow sense, it means the use of sophisticated hardware in teaching-learning process, including mobile phones, computers, overhead projectors, tape recorders, televised films, cassettes, videodiscs, gramophones, etc. and, in broader sense, it means the use of any new technique or method of teaching-learning process or suitable application of various skills for effective teaching-learning process. On the basis of the above discussion we may discuss its scope as follows:

**1)Analysis of Teaching-Learning Process**: Educational technology is concerned with the concept of teaching, the teaching process, variables of the teaching, phase of teaching, levels of teaching, theories of teaching, principles and maxims of teaching and so on. It also illustrates the concept of learning, application of the learning theories in the teaching-learning process, the relationship between teaching and learning etc.

**2) Specification of Educational Aims and Objectives:** Educational technology tries to identify the aims and objectives of education according to the needs and aspirations of the community and also examine of the available resources for satisfaction of these needs.

**3) Curriculum Development**: Educational technology is also concerned with the subject matter or contents of education. In other words it is concerned with the curriculum. It gives emphasis on framing a suitable curriculum for the achievement of the predetermined objectives.

**4) Development of Teaching-Learning Material**: Another aspect of educational technology is to plan, create and develop suitable teaching-learning material considering predetermined objectives, curriculum design and available resources.

5) **Teacher-Training:** In the teaching-learning process, teachers play very significant role, they have to perform complex responsibilities. Educational technology, therefore, tries to prepare good, responsible teachers for effective and efficient teaching-learning process. As a result teaching techniques like micro- teaching, Flanders' interaction analysis, simulated teaching etc. are evolved for teacher education programmes.

**6) Development and Selection of the Teaching-Learning Strategies, Techniques and**

**Tactics:** This aspect is concerned with the invention and discovery of various ways and means of teaching, selection and development of suitable strategies and tactic of teaching-learning process according to predetermined objectives and curriculum design.

**7) Development, Selection and application of the suitable Audio-Visual Aids:** Use of appropriate audio-visual aids influence the teaching-learning process very effectively. This aspect of Educational technology is concerned with the various types of audio-visual aids used in educational sector, their proper selection to a particular teaching-learning situation.

**8) Effective Utilisation of the Hardware and Mass Media**: Through the use of various sophisticated instrument, equipment, gadget and communication devices, a large section of people can be reached and also it is possible to impart knowledge within a stipulated time. For example, mass media like television, radio, newspaper, and other modern technologies like computers, mobile phones and information technology (e-mail, Internet, etc.) can contact any person from any corner of the globe within a second. Even knowledge can be imparted to the illiterate masses with the help of innovative methods and practices of teaching and learning.

**9) Effective Utilisation of the Sub-systems of Education:** Educational technology considers education as a system, consequently it has many subsystems. Hence it emphasises on smooth functioning of all the sub-systems for the achievement of educational objectives. Thus it views education not from any single approach, but as a holistic approach.

**10) Feedback and Evaluation of the teaching-learning process:** This aspect of Educational technology is concerned with the controlling the teaching-learning process by planning and developing suitable tools and devices for the continuous evaluation of the process and products of the teaching-learning activities.

**11) Preservation of knowledge/ information:** preservation of old knowledge or information is very much essential to understand any branch of knowledge in its totality. In ancient time, knowledge was transformed from one generation to another generation orally and then by hand written documents or manuscript. Gradually it is replaced by printed material. Presently they are documented in the form of audio/video CDs /in soft form in online or as e-content. Such documents become the source of information for learners. Educational technology has enabled teachers to store previous knowledge or information and transmit them to the next generation learners. Thus, education technology helps in collection, preservation and retrieval of information.

**12) Gaming and simulation: This is another important area of** Educational technology. Computer technology plays major role in this context. It can provide a replication of the real phenomena in different dimensions. Education technology is able to demonstrate the operation

of different parts of a phenomenon and the consequences. Another significant aspect of Educational technology is educational games. Through games, children can learn many concepts which are very tough to teach in a formal classroom situation. Further gaming and simulation have also proved to be useful in case of adult learners; for the training of teachers at both the pre-service and in-service levels.

13) **Distance Education/Open and Distance Learning/ On-line Education:** Educational technology has a great scope in distance education and Open and Distance Learning system. Educational technology, with its innovative practices, can provide education to the needy learners, who cannot attend regular classroom due to different obligations. Programmed learning materials, self-learning materials, modules, contact programmes, audio/video or online counseling, e- contents, discussion forum etc are some innovations that can help distance learners up to a great extent. This has made quality higher education accessible to the masses.

Learners, from the above discussions, we may infer that educational technology is concerned with all different components and aspects of the teaching–learning process. With the innovations of new technologies or methodologies in the field of education or with the development and enhancement in the teaching–learning process, the scope of Educational technology will be changing and expanding. Thus, as a discipline the scope of educational technology is widening day by day.

## Check Your Progress-3

1. Mention the scope of educational technology as given by S.S. Kulkarni.
2. Discuss any three scopes of Educational technology.

## 1.5 Approaches to Educational Technology.

According to Lumsdaine (1964), Educational technology has the following three distinct approaches:

1. Educational technology I (ET1) or Hardware Approach
2. Educational technology II (ET2) or Software Approach
3. Educational technology III (ET3) or Systems Approach

### 1.5.1 Hardware Approach

The hardware approach is based on the application of principles of engineering for developing electronic or mechanical equipments, instruments and tools for making the teaching-learning process more fruitful. Audio-visual aids like charts, models, filmstrips, motion pictures, slides, audio cassettes and equipments like films, projectors, radio, record player, television and computers are called educational hardware. In this system, the teaching process is being mechanized to reach maximum number of students in minimum time and at low costs.

Among the mechanical aids, the teaching machines are only aids that can fulfill instructional requirements. All the other audio-visual aids are to assist the teacher for improving the communication system. Presently, they are being used for instructional purposes especially in on-line mode.

Learners, as we all know our knowledge have three aspects- **preservation, transmission** and **development**. All these three aspects depend on Hardware approach. Let us explain this with some examples. In ancient time knowledge was transmitted from one generation to next generation or teacher to students orally. Gradually human started to preserve them in written form –hand written, using symbols or language. The **preservation** of the knowledge had become easier and wider after invention of printing machine; the knowledge was preserved in the form of books. Gradually, preservation of knowledge becomes more technology oriented with the development of different machines and they are stored in audio-video tapes, film strips, motion pictures, computers, mobile-phones, online as e-content and so on. As a result, the knowledge becomes safe, secure and easily accessible. Secondly, a teacher can communicate with a large group of students by giving lectures or presentation through radio, television or internet. That means, hardware approach facilitates the process of transmission of knowledge highly.

Lastly, for development of human knowledge research studies are carried out and, in this aspect, electrical gadgets (laboratory equipments, computers, software, calculators etc.) occupy an important place during collection and analysis of data and also during report writing. Therefore, we have seen that all these three aspects of human knowledge are highly dependent on hardware approach. Moreover, due to hardware approach, a large number of students can be addressed with limited infrastructure, lesser time and money.

Different scholars referred this technology by different names. Silverman (1968) called it as '*Relative Technology*' as it borrows and applies technology of physical sciences in the teaching-learning process. Here, educational technology acts as a simple 'service' function in the educational process. Another scholar, Ivor Davies termed this approach as the '*Audiovisual Archetype*' as this approach gives importance on the use of machines, devices, equipment and similar instructional aids.

Thus, we may summarize characteristics of hardware in the following points:

- Hardware components are generally electronic and mostly depend on mechanical systems.
- New techniques and researches are being conducted to evaluate the effect of

hardware.

- The outcome of hardware is direct and immediate because of its concrete form.
- Hardware components are the media of communication.

### 1.5.2 The Software Approach

The software approach is based on the principles of psychology. It is originated from behavioral sciences and their applied aspects concerned with the psychology of learning. Psychology of learning provides ways and means to modify students' behavior or to bring desirable behavioral changes in the students. B.F. Skinner and other behaviorists were credited with the revolutionary work in software approach. It is also termed as Instructional Technology or Teaching Technology or Behavioral Technology. Newspapers, books, magazines, educational games, flash cards may also form part of software. This aspect of educational technology is associated with modern principles and theory of teaching techniques, maxim of teaching, models of teaching, principles of programmed learning and so on. Some examples of components of software technology as follows:

- Task analysis
- Writing objectives in behavioral terms
- Selection of appropriate instructional design, strategies, tactics.
- Immediate reinforcement of correct responses
- continuous evaluation

Therefore, Software Approach is all about writing teaching objectives in behavioral terms, principles and methods of teaching, providing reinforcement to the learners during learning, feedback, reviews, student testing and finally evaluation. Software approach attempts to foster three basic components of technology, viz. Input, Process and Output.

It also examines various instructional issues, selects or constructs suitable measuring tools to evaluate instructional outcomes and selects/constructs methods, strategies and tactics to produce desired educational outcome. That is why Silverman (1968) termed it as *Constructive Educational Technology*. Ivor Davies, refers this approach as the '*Engineering Archetype*' which means the application of principles of behavioral science for the betterment of teaching-learning process. This approach gives importance on the learner and the learning along with use of hardware. Therefore, it is called the software approach. 'Technology is seen as a means of providing the necessary know-how for designing the new, or renewing the current, worthwhile learning

experiences. Machines and mechanization are merely viewed as instruments of presentation or transmission' (Davies, 1978).

### 1.5.3 The Systems Approach:

System approach is an innovative and systematic attempt to synchronize various aspects of a problem towards specific objectives. It analyzes different subsystems of the educational system and tries to make it more effective. Learners, let us first understand what "system" is.

- **The System:** It has three basic **components**- input, process and output. Learners, now please study Fig-I carefully.

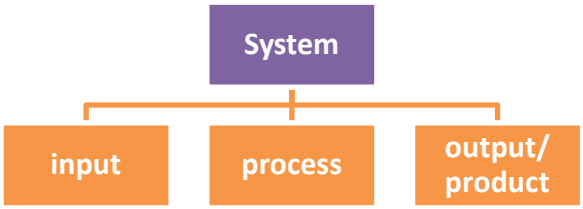


**Fig-I: Basic components of a system**

Every components of a system can be categorized within these three components. Whenever we put some inputs in the system, the process starts and finally we get some output or products according to the quality of inputs and the process.

Now, we will study few definitions here.

a. Dictionary meaning of System is – "a set of things working together as parts of a mechanism or an interconnecting network; a complex whole".

b. The Cambridge English Dictionay- "a set of connected things or devices that operate together.

c. Webster's Dictionary- "a system is a regularly interacting or independent group of items forming a unified whole".

Learners, now we will explain this concept with the help of a suitable example, say a tree. A tree is comprising of different parts like leaves, stem, roots, shoots, buds, flowers and so on. Every part has its own function, and contributes mutually to proper growth of the tree as a whole.

UNESCO has also given the example of human body in explaining a system. Our body consists of a large number of living cells, different sub-systems like circulatory system, nervous system, digestive system and so on. They all function within the large system- the human body

independently, and jointly for existence and proper functioning of the body itself.

Learners, hence we can say that the system is a multifaceted set of associated or interrelated things with continuous interactions and inter-dependence. All these connected or related things' work collectively and finally they are contributing towards an overall and complex function.

Thus, the education system also has different dimensions and components like students, teachers, curriculum, instructional media, materials and strategies, infrastructure, evaluation of instructional objectives, administration and so on. These all components work independently and accordingly contribute to the system as a whole. For smooth and appropriate functioning of the system, it is necessary to consider each and every subsystem separately and also the system as a whole. A proper coordination among all these components/ sub-systems is essential for effective and efficient functioning of the system. This is what system approach to education talks about and that's why this approach is also known as ***Management Technology***. It was developed after World War-II. Any issues related to administration, management, commerce, industry, army etc can be solved scientifically with the help of this approach. Or simply, we may say that it provides a scientific basis to the decision-making process of any field. Thus, it is also applicable in the educational system and it helps in studying issues related to educational administration, management and the selection of appropriate instructional design. It makes the education system more effective as well as less expensive. That's why it occupies an indispensable place in the field of education.

## Check Your Progress-4

1. What are the three different components of Educational Technology?
2. How many different aspects our knowledge have? What are they?
3. Match the following:

| | |
|---|---|
| a. Silverman | (i) Engineering Archetype' |
| b. Ivor Davies, | (iii) Management Technology ' |
| c. Systems Approach | (iii) 'Relative Technology' |

### 1.6 Educational Technology as System Approach to Education:

Learners, you have already learnt about system approach in the previous sub-section of this unit. Now we shall discuss how this can be applicable to any educational institution; or in other words, how it can be applied to make the education system more effective. In the words of Keshaw and Michean, Systems approach is " one of the techniques which aim at finding the most efficient and economically intelligent methods for solving economically intelligent methods for solving the problems of education scientifically." Twelkier defines it as- "a management tool that

allows individuals to examine all aspects of the organization, to inter relate the effects of one set of decisions to another and to optimally use all the resources at hand to solve the problem".

It should be applied as an integral part of the whole educational environment to improve the whole educational scenario. But it is necessary to accept this approach by all the concerned components of that environment; or else, it will not be effective and its implementation will meaningless as it will unable to bring development. Moreover, it is also necessary to create awareness, impart necessary knowledge and skills among the stakeholders. For this purpose, teachers, educational planners and administrators need training and orientation about this systems approach. The teacher has to plan for utilization of available resources, use of media, application of various teaching methods and techniques and so on. For this, she needs to have adequate knowledge about the subject matter, limitations of the environment, individual differences of the children, suitable methods as well as materials. The systems approach involves continuous evaluation, which provides feedback to the system and accordingly easy to revise the plan wherever necessary.

As we have already mentioned that every system has three aspects-input, process and output. Thus, systems approach to education also has these three aspects. In the following we will have a detailed discussion.

i. Input: it includes learners, teachers, administrators and other staff and infrastructures

   - The Learners: Entry behaviours, previous achievements, abilities, comprehension and motivational level of the learners.
   - The Teachers: teaching skills, competencies and awareness of teaching-learning methods.
   - The administrators and other staff: efficient and skilled administrators and other staffs
   - The infrastructures: school facilities, availability of various media and teaching aids.

ii. Teaching-learning Process: It includes various means, tools and devices of teaching-learning situations. Preparing the subject matter, selecting and using appropriate teaching methods and tactics, identifying and applying learner friendly communication technique or media, providing suitable schedules of reinforcements, establishing good rapport with the learners, providing appropriate school environment etc. to achieve desired behavioural changes among the learners.

iii. Output: It includes mainly terminal behavior of the learners. The results, grade of the

learners, their knowledge level, competencies and skills all are considered as output or product.

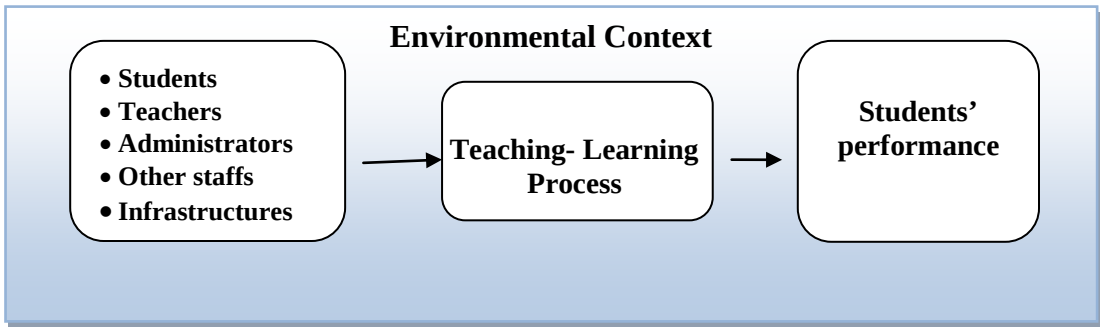


**Figure: II: Systems approach to Education**

**1.6.1 Steps in the Systems Approach in Education:** Let us now study the major steps in the Systems Approach in Education:

1. Formulating of specific instructional objectives to be achieved and defining instructional objectives,
2. Deciding appropriate media to achieve already determined objectives,
3. Defining learner characteristics and requirements,
4. Selecting appropriate methods suitable for effective learning to take place,
5. Selecting appropriate learning experiences from available alternatives,
6. Selecting appropriate materials and tools required,
7. Assigning appropriate personal roles for teachers, students and supporting staff,
8. Implementing the programme,
9. Evaluating the outcome in terms of original objectives measured in terms of student performance and
10. Revision to improve efficiency of the system for improvement in the teaching-learning process.

Now we will discuss these steps in details.

1. **Formulation of specific instructional objectives:** This is the first step of systems approach. What is to be taught, what and how many types of learning experiences are to be provided to the learners, etc are pointed out in this step. These objectives should be written in behavioral terms so that they could be measurable. These objectives should be specified after fixing the aims and objectives of entire system.

2. **Deciding Appropriate Media:** Proper selection and, after that systematic and logical arrangement of different media like print, audio, video, audio-video, e-content etc is very important to achieve already determined objectives**.**

3. **Defining Learning Characteristics and Requirement:** The third step of systems approach is to construct a test based on the objectives to know learners' characteristics s and their needs. This type of test is known as the criterion test.

4. **Selection of Appropriate Methods:** The next step of systems approach is the selection of appropriate methods and strategies. The methods, strategies and tactics are to be selected keeping in view the learner's characteristics and the subject matter so that effective learning should take place.

5. **Selection of Appropriate Learning Experiences:** Selection of appropriate learning experiences from available alternatives is another important step of systems approach. What type of interactions, courses, programs or any other experiences where learning takes place should be appropriate for the learners or what type of settings or combinations of settings is suitable for effective learning etc. things are considered in this step. Here settings refer to traditional (class room, school) and non-traditional (outside school campus, field trip, on-line education) settings. So teachers and educational planners duty is to select and arrange them in advance for effective learning.

6. **Selection of Appropriate Materials and Tools:** It is necessary to select appropriate materials, resources, equipments / tools and environment to provide the learners with the learning experiences.

7. **Assigning Appropriate Personal Roles**: Allocation of personal **roles for teachers, students and supporting staff** before teaching is another important step in systems approach to education. Hence, prior to teaching, the **roles for teachers, students and other supporting staff** should be defined according to already selected objectives, media, learning experiences and so on.

8. **Implementing the Programme:** A model of the system is prepared by assimilating the selected media, methods, materials, strategies and the proposed learning activities. Each component and element perform the pre- determined activities smoothly and flawlessly. These activities are implemented to a trial group of learners in particular situations to test the effectiveness of the system.

9. **Evaluation of Out-Comes:** After implementing the system, it is necessary to evaluate the

system. The already determined objectives are achieved or not is/ are tested with some measuring instruments like tests, tools and techniques**.**

10. **Analysis of Results and Modification of System:** After evaluation, the strength and lo- faults in the system can be identified and accordingly necessary modification in the system approach is done so to make the system effective.

### 1.6.2 Characteristics of Systems Approach:

A good and efficient System has certain characteristics, these are as stated below:

1. **The Concept System:** A system consists of dynamic and active organization of different parts, the parts process in mutual interaction and the whole is treated as greater than the sum of isolated parts.

2. **The Concept System is Relative Concept:** Every system has a supra –system and sub systems. If we consider the educational institution as a system, a larger system will be its supra or super system. For example, let us consider Directorate of Open and Distance Learning, Dibrugarh University as a system. Then Dibrugarh University will be its supra-system and if we consider Dibrugarh University as a system, then a larger system, society will be its supra system. Similarly, students of MA program in Education can be studied as system and also as a sub-system of a larger system, namely Directorate of Open and Distance Learning, Dibrugarh University.

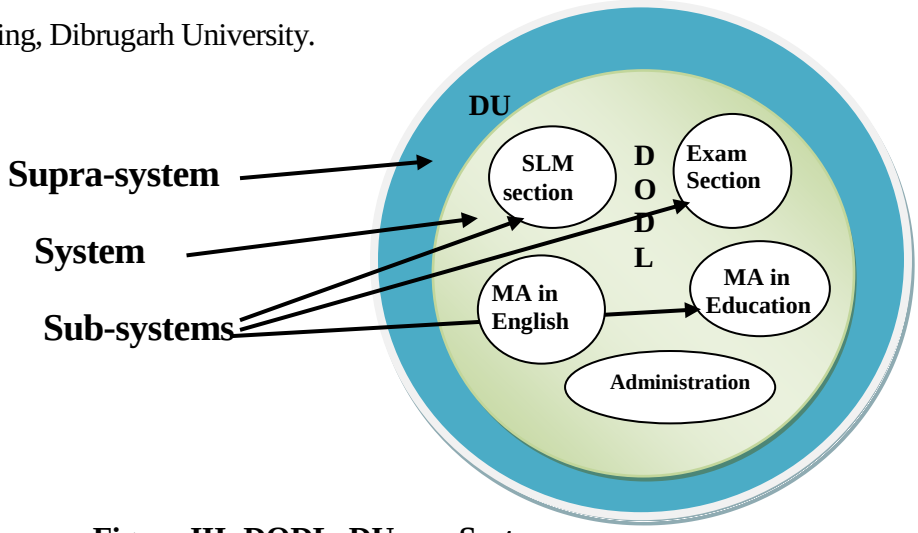


**Figure-III: DODL, DU as a System**

3. **Flexibility:** A System is either closed or open. An open system is flexible. In a closed system new information is not accepted whereas an open system always welcomes changes. For an effective educational system, the teacher, the academic planner and all the other parts should have an open mindset to welcome changes in the content, curriculum, methods and media of teaching, style of the teachers' presentation etc according to the

information that is received from the learners.

4. **Goals:** All systems have some pre-determined goals and objectives; hence a system should be evaluated in terms of the efficiency of achieving the goals and objectives.
5. **Constraints:** Every system has constraints and limitations as it does not work in a vacuum. It has a boundary, surrounded and also influenced by other systems. For example, in spite of all necessary efforts given by a school the results of the school is not according to the expectation of the school authority. After continuous observation, they find that the media and materials adopted by the teachers are not user friendly. So, they study the situation and change the media according to the standard of the learners. Such a modification is necessary for achievement of goals and objectives of a system.
6. **Alternatives:** In every system analysis design, there should be always some provision for alternatives so that the system can be run smoothly without any obstacles. For example, if the computer teacher of the school is absent for long duration due to his ill health there should be at least one teacher who may take the computer classes. There should be some other alternative way. One of them may be the provision of appointing a part time teacher immediately.
7. **Feedback:** It is another important aspect of the systems approach. Every system provides periodic feedback which is very important for the growth and development of the system.
8. **Reversibility:** The systems approach has another important aspect, particularly in the open system, provision for the revision. The revision can be in terms of repeating and re-sequencing the different steps, changing the media, materials, methods and personal role of the teachers, students and other supporting staff and so on. Evaluation and revision are integral parts of all systems designing.

## Check Your Progress-5

1. **Why formulating of specific instructional objectives is considered as the first step of systems approach?**
2. **Mention five characteristics of a good System.**

### 1.6.3 Advantages and Limitations of Systems Approach:

As in every system, every aspect has both advantages and limitations, systems approach is also have some advantages and limitations. Learners, we will discuss them in the following headings-

- **Advantages of Systems Approach**

1. **Provides conceptual framework to run the system**: It provides a blue print of the

plans for implementing changes in the system. Thus it provides conceptual framework for planning, organizing, leading and controlling the system which lead to qualitative improvement in the educational process.

2. **Identification of the resource materials**: It helps to identify the resource materials which are suitable and also available to achieve specific goals. Moreover, assessment of the resource needs, their sources and facilities in relation to time, expenses, quantities, and other factors can be done.

3. **Technology oriented**: Assimilation of materials, media and man power can be done systematically and proportionately with the help of technology to attain the already defined goals. Thus, the educational goals become achievable in System approach.

4. **Continuous Evaluation:** Due to flexible nature, the system can be modified time to time on the basis of continuous evaluation to make the system more efficient and effective.

5. **Holistic Approach**: It considers the system as a whole, not as some parts. So, it gives importance on all the parts equally to bring the desirable changes in the system.

❖ **Limitations of Systems Approach:**

1. **Resistance to change**: It is very difficult to acknowledge the new things and to avoid the old ways as they become our habits. People generally do not like to accept any new method or approach, as they like to avoid risk.
2. **Involves hard work:** As in Systems approach, system is considered as the assimilation of different parts, it needs to follow some specific steps and so on, it involves continuous and laborious work on the part of school personnel. So, it is very difficult to convince some school personnel for these extra loads.
3. **Lack of understanding:** As the Systems approach is a new concept, the school Administrators and Teachers are not accustomed with this. They do not have proper understanding of this system, so it is very tough to implement this approach in educational system without proper orientation regarding this among the stake holders of the system.
4. **Expensive in the initial stage:** A large amount of capital cost is needed to implement systems approach in the initial stage. Hence many institutions find it risky to put into practice.

### 1.6.4 Purpose of Systems Approach in Education:

Learners, you have already comprehended what systems approach is. It is a rational approach for planning, organizing, decision making, controlling for realizing the already determined objectives of the system in the best possible ways. Application of system approach in education will surely make the system more efficient and effective, and also keep the system in equilibrium. The various problems related with the administration and management of the educational process and products (output) of education are expected to resolve by the systems approach. Learners, here we are trying to summarize the purposes of systems approach in education, please study carefully.

1. To improve the entire instructional process. by considering each and every component of the system
2. To bring efficiency in the administration and management of the educational institutions.
3. To ensure maximum effective utilization of the educational resources whether human or non-human resources.
4. To plan systematically and scientifically to achieve the institutional, regional or national objectives and goals whether they are short-run or long-run.
5. To bring a revolutionary changes in the education system by improving the examination and evaluation system.
6. To facilitate the school administrator in organizing various curricular, co-curricular and extra-curricular activities, all the other educational components that can bring cognitive, affective and psycho-motor development in the students.
7. To assist, maintain, control, improve and sustain the guidance and counselling services of the educational institution.
8. To provide guidance and provisions for upgrading the professional life of the teachers and other staff of the educational institution through various pre-service and in-service the training and development programmes.
9. To provide valuable services to improve the quality of education in all its aspects and dimension.

## Check Your Progress-6

1. Write one advantage and one limitation of systems approach (other than the given points in the sub-section 1.6.3)
2. List three purposes of systems approach in education.

## Let Us Sum Up:

Learners let us give a review on the summary of this unit-

- With the fast development of science and technology, we are becoming very dependent on technology for every aspect of our day- to- day life.
- The word 'technology' is derived from the Greek word *technología*, which means 'art'.
- Educational technology can be defined as the application of scientific and technological inventions in the field of education to improve the teaching-learning process.
- In the year 1967, Brynmor Jones of England used the term *Educational Technology* for the first time.
    - After that in one of its conference, National Council of Educational Technology (NCET) of England gave a detail analysis of this term. Gradually it achieves the status as a branch of Education like other branches viz. Educational Philosophy, Educational Psychology, Educational Sociology and so on.
- The scope of educational technology can be categorized into three broad aspect as given by S.S. Kulkarni. They are
    - to analyze teaching-learning
    - to evaluate the functions of the components of teaching-learning, and
    - to interpret these components in such a way that effective results can be achieved.
- The technology has three different components- input, process and output; as a part of technology; Educational Technology also has these three aspects.
    - Input: it includes learners, teachers, administrators and other staff and infrastructures
    - Teaching-learning Process: It includes various means, tools and devices of teaching-learning situations.
    - Output: It includes mainly terminal behavior of the learners.
- The main components of educational technology are methods, materials media and manpower.
    - The first component of educational technology, methods means using teaching machines, team teaching, micro-teaching and personalized system of instruction in teaching–learning situations.
    - The second component of educational technology is Materials. It comprises instructional materials like programmed textbooks, manuals, guides, texts, SLMs, e-

contents and other written/print materials.

- The third component media involves using audio or visual or both audio-visual media, such as radio, tape recorders, charts, maps, posters, films, educational television and you-tube video as teaching aids to supplement effective teaching and promote better learning.

- The fourth component is manpower; it refers that selection and assimilation of above three components are done by a teacher or an educational planner or administrator only. He/she controls educational technology in every way.

➢ There are three approaches of Educational technology- hardware approach, software approach and systems approach.

- The hardware approach is based on the application of principles of engineering for developing electronic or mechanical equipments, instruments and tools for making the teaching-learning process more fruitful. Some examples are- charts, models, filmstrips, motion pictures, slides, audio cassettes, films, projectors, radio, record player, television and computers etc. In this system, the teaching process is being mechanized to reach maximum number of students in minimum time and at low costs

- The software approach is based on the principles of psychology. It is originated from behavioral sciences and their applied aspects concerned with the psychology of learning. Psychology of learning provides ways and means to modify students' behavior or to bring desirable behavioral changes in the students.

- System approach is an innovative and systematic attempt to synchronize various aspects of a problem towards specific objectives. It analyzes different subsystems of the educational system and tries to make it more effective.

➢ Systems approach to Education can bring desirable changes to an educational institution.

- It should be applied as an integral part of the whole educational environment to improve the whole educational scenario
- It is also necessary to create awareness, impart necessary knowledge and skills among the stakeholders before implementing.
- Every system has a supra –system and sub systems.

➢ Systems approach to Education in important as

- It can improve the entire instructional process by considering each and every component of the system , bring efficiency in the administration and management of the educational institutions, ensure maximum effective utilization of the educational resources whether human or non-human resources and so on.

## Key Words

- **Technology:** It is the making, modification, usage, and knowledge of tools, techniques, machines, systems, and methods of organization, in order to solve a problem and achieve a goal.
- **Open system:** It is a system which continuously interacts with its environment or surroundings.
- **Instructional objectives:**
- **Educational objectives:**

## Terminal Questions

1. What do you mean by education technology? Briefly describe its history.
2. What are the components of educational technology? Briefly explain each of them.
3. List some of the audiovisual aids used in the hardware approach.
4. What is systems approach to education? Explain with a suitable example.
5. List any three advantages and limitations of the systems approach.
6. Discuss five purposes of systems approach.

## Suggested Reading

Aggarwal, J. C. (2011), *Essentials of Educational Technology*, Vikash Publishing House Pvt. Ltd., New Delhi-110002.

Das, B.C. (2010) *Educational Technology*. New Delhi : Kalyani Publishers, New Delhi-110002.

Joyce B. R. and Marsha W. () *Models of Teaching,* Pearson , New York, US

Sharma, Y.K., (2008) *Fundamental Aspects of Educational Technology.* Kanishka Publishers,New Delhi-110002.

Sharma, R.A. (2010) *Educational Technology*: Aggarwal Publications Agra-2.

## Model Answers to 'Check Your Progress'

### Check Your Progress-1

1. a) how to teach, b ) Greek word , c) Extension
2. Input- a, c, g.
   Process- b, e.
   Output- d,f.
3. Two different types- technology as things and technology as social process or human activity.

### Check Your Progress-2

1. According to J.C. Aggarwal the different components of Educational Technology are -machines, media, materials, methods and men.
2. a. Methods, b. Materials, c. Media, d. Materials.

### Check Your Progress-3

1. S.S. Kulkarni has categorized the scope of educational technology as :
   (i) to analyze teaching-learning
   (ii) to evaluate the functions of the components of teaching-learning, and
   (iii) to interpret these components in such a way that effective results can be achieved.

**2 .Please study sub-section and try yourself**

### Check Your Progress-4

1. a ) Hardware Approach, b )Software Approach, c) Systems Approach
2. Three; Preservation, transmission and development.
3. a -- (iii), b. – (i), c. – (ii)

### Check Your Progress-5

**1.**

**2. See sub-section 1.6.2 and then try yourself**

### Check Your Progress-6

1. Advantage- the teaching learning system becomes more effective and goal oriented as in the systems approach the educational objectives are decided before-hand on the basis of available resources.

Limitations-the teachers, the educational administrators and planners needs proper training and orientation regarding systems approach. Otherwise it is very tough to achieve success.

2. Purposes of systems approach in education-

    a) To improve the entire instructional process by considering each and every sub-systems of the system.

    b) To carry out the administrative and managerial function of the educational institutions more efficiently.

    c) To ensure maximum utilization of the educational resources whether human or non-human resources in an effective way.

**Course : 201**

**(EDUCATIONAL TECHNOLOGY)**

**Unit- II: EDUCATIONAL TECHNOLOGY AND INSTRUCTIONAL TECHNOLOGY**

**STRUCTURE:**


**2.0 Introduction**

**2.1 Objectives**

**2.2 Educational Technology**

**2.3 Various Forms of Educational Technology**

**2.3.1 Teaching Technology**

**2.3.2 Instructional Technology**

**2.3.3 Behavioural Technology**

**2.4 Educational Technology and Instructional Technology**

**2.5 Summing Up**

**2.6 References and Suggested Readings**


## 2.0 INTRODUCTION

Rapid advances in technology affect every facet of our lives, from the way we conduct business to the social relationship we form. Educational technology standards are the road map to teaching effectively and growing professionally in an increasingly digital world. Technology literacy is a crucial component of modern society. Therefore, today's educators must provide a learning environment that takes students beyond the walls of their classrooms and into a world of endless opportunities. Technology standards promote this classroom transformation by ensuring that digital- age students are empowered to learn, live and work successfully today and tomorrow.

This unit is planned to help you develop a perspective in which to understand and critically look at various aspects of educational technology.

This unit is also planned to understand the concept of instructional technology and to help you distinguish between educational technology and instructional technology.

## 2.1 OBJECTIVES

After going through this unit, you will be able to:

- *understand* various aspects of educational technology
- *define* instructional technology
- *distinguish* between educational technology and instructional technology.

So far as the previous chapter is concerned you have concentrated on various components of educational technology including software, hardware and system approach to education. This unit introduces you various forms of educational technology. Also you will be able to understand the meaning of instructional technology and differentiate between educational technology and instructional technology.

## 2.2 Educational Technology:

Educational technology is a new emerging discipline. It is a field of applied science. In one sense educational technology means technology applied to education. Educational technology is which optimize the human learning. Educational technology applies the products of science, scientific theory and principles and discoveries to strengthen the process and organization of education. Educational technology explain that how the educational process can be improved. It is concerned with the enhancement of the educational process. It suggests how to make educational process effective. How the available means and resources may be best utilized in educational process to make it effective? So, that it could bring the all round changes in the behavior of the learner. However, educational technology implies the use of scientific and technological methods and concepts in the teaching learning process. The main objective of the use of educational technology is to improve the learning. Simply,

educational technology is a branch of technology .it is a system in education in which machines, materials, media, men and methods are inter-related to work together for the fulfillment of specific educational objectives.

## 2.3 Various Forms of Educational Technology

There is a rapid advancement in the field of industries, agriculture, defense, trade, commerce, and administration. Education cannot afford to be without it and hence there is a revolutionary change in education also and thus teaching learning process has emerged out in a shape. Here educational technology came with its various forms and dimensions which are as follows.

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

### 1. Teaching Technology

Teaching is the social and a professional activity. It is a process of social development. It is a system of action which induces learning through interpersonal relation.

Teaching technology is the application of philosophical, sociological and scientific knowledge to teaching for achieving some specific learning objectives.

Teaching is a purposeful activity. The ultimate goal of teaching is to bring all-round development of the child. The knowledge and practice which help in realizing the goal is the content matter of teaching technology. Teaching is an art as well as science because teaching can be studied objectively and scientifically. Teaching has the scientific foundation. This has evolved the concept of ‘teaching technology’. I.K.Davies, N.L.Gage, Robert Gagne, Burner and Robert Glase have contributed significantly in this area of education.

**Assumptions**

Technology of teaching is based on the following assumptions:

1. Teaching is a scientific process based on content and communication.
2. Desired learning structure may be generated with the help of appropriate teaching situation.
3. A close relationship may be established between teaching and learning.
4. The teaching activities can be modified and improved.
5. Teaching skills can be developed with the help of feedback devices.
6. The learning objectives may be achieved by performing teaching activities.

**Main Features of Teaching Technology**

1. All the three type objectives: cognitive, affective and psychomotor can be achieved by this technology.
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 organized from memory level to reflective level.
5. The teaching process can be made effective with the help of Teaching Technology.
6. The teaching theories can be formulated by the use of Teaching Technology.
7. The pupil-teachers and in-service teachers can improve their teaching and make it more purposive by the use of the teaching technology.
8. Teaching technology implies the input, process and output aspects side by side.

**2. Instructional Technology**

The instruction has significant role in human learning because most of the human learning is accomplished through instruction while animal learning through conditioning. The systematic actions which

induce learning are known as instruction. The instruction stands for development of knowledge and beliefs. Instructional technology means a network of techniques or devices employed to accomplish certain defined set of learning objectives. Instructional technology implies the application of psychological and scientific principles and knowledge to instruction for achieving the specific objectives of learning.

The origin of instructional technology is from psychological laboratory experiments. The most important example of instructional technology is 'programmed instruction'. The programmed instruction and instructional technology can be used interchangeably.

**Assumptions**

The instructional technology involves the following assumptions:

1. The content matter can be divided into its elements and each element can presented independently.
2. The external learning conditions can be created by arranging the elements in a logical sequence.
3. The appropriate reinforcement can be provided continuously by the use of instruction.
4. The student can learn according to his needs and rate of learning.
5. The strategies and tactics of instruction can be used for achieving certain well defined set of instructional objectives.
6. The student can learn successfully without the physical presence of a teacher.

**Main Features of Instructional Technology**

1. The cognitive objectives can be achieved effectively by the use of instructional technology.
2. The learner gets an opportunity to learn according to his own pace. Thus, the individual differences are controlled in this technology.
3. The right responses of the students are conformed for providing the reinforcement continuously.

4. The instructional technology incorporates the psychological learning theories and principles.
5. The learning external conditions, contiguity practice and reinforcement are created with the help of instruction.
6. The instructional theory may be developed by using this technology in learning process.
7. The instructional technology can be employed in shortage of effective teachers.
8. It provides the deep insight into the content structure and sequence of its elements.

### 3. Behavioural Technology

Psychology is the science of behavior. It studies the nature and structure of behavior of the organism. The learning is the modification of behavior through activities and experiences. The educational activities are designed to bring desirable changes in the behavior of the students. The psychology deal with the every type of human behavior .Thus the behavioural technology has the wider field than educational technology. It cover the area of industry, defense, commerce, communication, administration, health, motivation, training, education, teaching and instruction. These areas need the specific type of behavior. B.F. Skinner has referred the term behavioural technology in his book Technology of Teaching.

The teaching and instruction activities are organized to achieve specific learning objectives by bringing the desirable behavioural change among the students. Thus, the teaching and instructional technology are the two forms of behavioural technology. But in the field of education it refers mainly to the teacher's behavior. The behavioual technology is the application of scientific knowledge in modifying the teacher behavior. This is also termed as training technology.

**Assumptions**

The behavioural technology is based on the following assumptions:

1. Teacher behavior is observable.
2. Teacher behavior is measurable and quantifiable.
3. Teacher behavior is relative.
4. Teacher behavior is social and psychological.
5. Teacher behavior is modifiable.

**Main Features of Behavioural Technology:**

1. It has the focus to achieve the psychomotor objectives. The specific teaching skills can be developed.
2. The classroom behavior components and flow to behavior can be studied and suggestions can be given for desirable change.
3. The knowledge and practice of behavioural technology may be an important instrument for training colleges to produce effective teachers.
4. The proper reinforcement can be provided to pupil-teachers during teaching practice.
5. The content and communication aspects can be improved by the use of feedback devices.
6. The individual differences of pupil-teachers can be considered in providing the training of teaching.
7. The teaching performance can be evaluated objectively and systematically.
8. The behavioural technology may be helpful in developing the theory of teaching.

## 2.4 Educational Technology and Instructional Technology

Educational technology is often confused with instructional technology. In fact those who treat educational technology as a synonym for instructional technology necessarily make the mistake of identifying the part while referring the whole. It means

instructional technology is a part of educational technology. However, the following chart will make you more clear and understand educational technology and instructional technology.

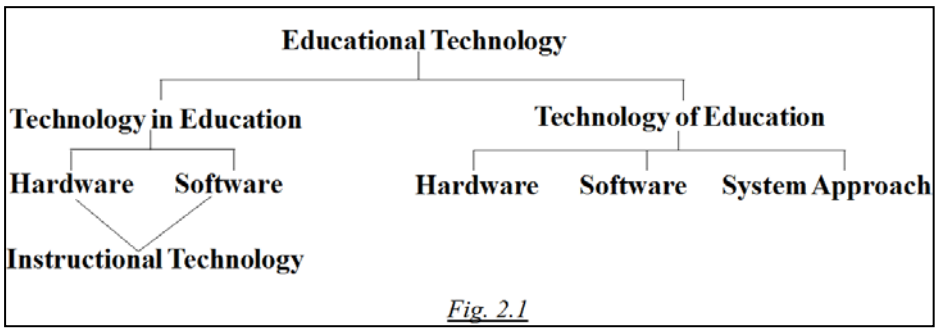


*Fig. 2.1*

As you know there are two different aspects of instructional technology, namely hardware and software. So in this context, instructional technology can safely be called technology in education as both technology in education and instructional technology have similar aspects, e.g., hardware and software. Instructional technology, therefore, may be defined as instructional equipment designed to back up a particular teaching strategy with a view to achieving educational objectives, for example – Computer Aided Instruction.

On the basis of the above discussion on various forms of educational technology now we can differentiate between educational technology and instructional technology.

**Difference between Educational Technology and Instructional Technology:**

1. Educational technology is a whole and instructional technology is a part of it.
2. Instructional technology denotes a subset of educational technology.

3. Educational technology involves hardware, software, and a system approach, whereas instructional technology is associated with hardware and software alone.
4. Educational technology involves knowledge of communication techniques and teaching methods, application of modern skills to education and training, facilitation of learning by employing various media, practical knowledge for designing educational and training programmes and evaluating learning activities.
5. Instructional technology is just associated with the instructional part of educational technology.
6. Educational technology, therefore, cannot be treated as synonymous with instructional technology.

## 2.5 Summing Up

1. Educational technology is a new emerging discipline. It is a field of applied science. In one sense educational technology means technology applied to education. Educational technology is which optimize the human learning. Educational technology applies the products of science, scientific theory and principles and discoveries to strengthen the process and organization of education.
2. Educational technology came with its various forms and dimensions which are- Teaching Technology, Instructional Technology and Behavioural Technology.
3. Teaching technology is the application of philosophical, sociological and scientific knowledge to teaching for achieving some specific learning objectives.
4. Instructional technology means a network of techniques or devices employed to accomplish certain defined set of learning objectives. Instructional technology implies the application of psychological and scientific principles and knowledge to instruction for achieving the specific objectives of learning.

5. Behavioural technology has the wider field than educational technology. It covers the area of industry, defense, commerce, communication, administration, health, motivation, training, education, teaching and instruction. These areas need the specific type of behavior. B.F. Skinner has referred the term behavioural technology in his book Technology of Teaching.
6. Educational technology cannot be treated as synonymous with instructional technology. There are differences between the two.

## 2.6 Reference & Suggested Readings


- Aggarwal, J.C.: Essentials of Educational Technology: Teaching-learning innovations in Education, Vikash Publishing House, New Delhi
- Khandei & Khan: Advanced Educational Technology, APH Publishing Coorporation, New Delhi 02
- Mangal, S.K.: Foundations of Educational Technology, Tondon Publication, Ludhiana
- Rao, Usha: Educational Technology, Isha Book, Delhi, 2005
- Sarma, A.R.: Educational Technology, Shri Vinod Pustak Mandir, Agra 2


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# BLOCK II
# COMMUNICATION AND TEACHING

# Unit-1
# COMPONENTS OF COMMUNICATION PROCESS

**Structure**


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## 1.0 Objectives

After going through this unit, you will be able to:

- Explain the concept and importance of communication
- List the characteristics and components of communication
- Discuss verbal and non-verbal communication
- Identify the various modes of non-verbal communication
- Give the various definitions of teaching
- Highlight the key assumptions and characteristics of teaching

## 1.1 Introduction

In the previous units, you have learnt about educational technology and instructional technology. In this unit, you will learn about the significance of communication in the field of education.

In today's world of science and technology where man is moving towards more and more advancement, we cannot deny the fact that our

education system is also being affected. However, the success of education cannot be achieved merely by replacing human beings with technologies. It needs a right blend of both labour and scientific inventions. We have to utilize the existing resources to improve the way we communicate with each other. In order to make the process of teaching–learning more effective, communication, as the most important tool, should be used in a proper way. However, it has been found that there are some principles of communication which may help in improving the relationship between teachers and students. Communication is a powerful means of bringing about social change. The revolution in media has helped in accelerating the pace of social change during the last few decades.

As you proceed, you will also learn about the importance of teaching. Some of the important aspects of teaching that will be dealt with in detail in this unit are assumptions of teaching and key characteristics of teaching.

## 1.2 Communication

Man is a social animal and his ability to communicate is the prime factor that distinguishes him from other animals. Apart from basic necessities, one needs to be equipped with good communication skills. We always want to share our thoughts, feelings, ideas and beliefs with other people around us. We can exchange information through words, gestures, signs and symbols, expressions; tone etc. One can also make use of technical media, like telegraphy, radio, television, computer and Internet for interaction. This interaction is called communication. Communication, derived from the Latin word '***communicare***' which means 'to share', is the process of transmitting information and receiving it. Communication is a complex and ongoing process. It is a process of exchanging verbal and non-verbal messages. The way we communicate is a learned style. We grow up watching our parents and other people communicate with each other. As adults, we can learn improved ways of communication by observing others who communicate effectively, learning new skills and practising those skills. The ability to effectively communicate at work, home and in life is probably one of the most important sets of skills a person needs. In the process of teaching–learning communication plays a very important role. If a teacher is good communicator, only then will he/she be able to interact with students properly to make them understand his/her ideas or thoughts. Any idea or thought which is not shared is of no use. Hence communication is must as it involves transmission of message by a sender and its proper understanding by the receiver.

### 1.2.1 Definitions of Communication

Some of the important definitions of the process of communication are as follows:

- W.H. Newman and C.F. Summer Jr. defined communication as, 'an exchange of facts, ideas, opinions or emotions between two or more persons'.

- According to John B. Hoben, 'communication is the verbal interchange of thoughts or ideas'.
- According to Martin P. Andersen, 'communication is the process, by which we understand others and in turn, endeavour to be understood by them. It is dynamic, constantly changing and shifting in response to the total situation'.
- According to Warren Weaver and Claude Elwood Shannon, the authors of *The Mathematical Theory of Communication,* 'communication involves all the procedures by which one mind may affect another. This involves not only written and oral speech, but also music, the pictorial arts, the theatre, the ballet, and in fact all human behaviour'.
- According to Merrihus, 'communication is a process of mutual exchange of thoughts, ideas, facts and emotions'.
- According to psychologist and educational reformer John Dewey, 'communication is a process of sharing experiences till it becomes a common possession'.

### 1.2.2 Characteristics of Communication

Communication has some basic characteristics, which are discussed as follows:

- **Purposeful:** Communication always involves a purpose. Whenever an idea or thought arises in the mind of a sender, he wants to communicate it. This means there is always some purpose behind it.
- **Universal:** Communication is the only way through which human beings can share information. Thus, communication is a universal process as it occurs almost everywhere.
- **Interactive:** Interaction is primary characteristic of communication in which two or more persons or groups interact with each other. It may results in social interaction. Thus, it is a two-way dynamic flow of information.
- **Imperfect:** A perfect communication is never possible in reality because what a person thinks can never be exactly understood by the receiver. This is because every individual is different from the other and perfect synchronization of minds is never possible.
- **Dependent:** Communication is performed with the help of some media. Communication is now carried out through various channels or modes, ranging from sophisticated communication media and technology, to non-verbal signals. So, it is dependent on some media through which message from one person could be sent to another.
- **Complex:** Communication is a complex process which involves various steps. A number of barriers can hinder this process at both ends (sender and receiver).

- **Contextual:** Communication always takes place within a context. The context of communication has at least four dimensions: (i) physical, (ii) social, (iii) psychological and (iv) temporal. These dimensions interact and influence, and are influenced by one another.

### 1.2.3 Importance of Communication

As we have already discussed, communication is nothing but transmission and understanding of message from sender to receiver. It is a very important aspect of human life because it is only through communication that human beings can interact with each other as individuals and as independent groups. It is an essential and basic process in all fields of life. Communication skills can be used virtually in every field. Effective communication is important because it allows people to lead more satisfying lives. Some other reasons which explain why communication is important are as follows:

- **Transmission of information:** Communication is must to transfer information between individuals and places. Any message which is not communicated is of no use.
- **Displaying ideas/emotions:** Whether it is in written or oral form, we always express ourselves by communicating with others. Without communication, we are not able to express our feeling or ideas. Hence, communication is important to transmit emotions/ideas.
- **Education:** The whole process of education involves imparting of knowledge to students by the teacher. However, this knowledge is imparted by various media which depend on communication. Education without communication is impossible.
- **In relationships:** Communication plays a vital role in building relationships between people. It facilitates dialogue, exchange of expression and emotions which result in relationships. The type of communication decides the relation. It could be personal or professional.
- **Entertainment:** To break away from the daily schedule of life full of stress, entertainment is a crucial part of everyone's life. Nowadays, every source of entertainment like movies, music, television shows, games, theatre or even anecdotes narrated by people involve communication.
- **Achievement of goals:** The importance of communication becomes much more crucial when we are on a mission, or need to achieve a goal. Without a means to communicate, an organization will become isolated. The ability to effectively communicate is very important to achieve the set goals.
- **Cultural promotion:** Communication offers a prospect to promote and preserve culture and traditions. It helps people in fulfilling their desire to be creative.

- **Integration:** It is with the help of communication that many people in a large number of countries all over the world, gain awareness related to each other's customs and tend to admire each other's lifestyle and culture. It progresses the activity of being integrated and tolerant with respect to each other.
- **Discussion:** The processes of debating and discussing elucidate various perspectives on matters that are of interest to people. With the help of communication, the reasons for difference in opinions and imparting of new ideas to others can be pinpointed.

### Check Your Progress-1

1. Define communication as per Martin P. Andersen.

   _____

   _____

2. List at least three characteristics of communication.

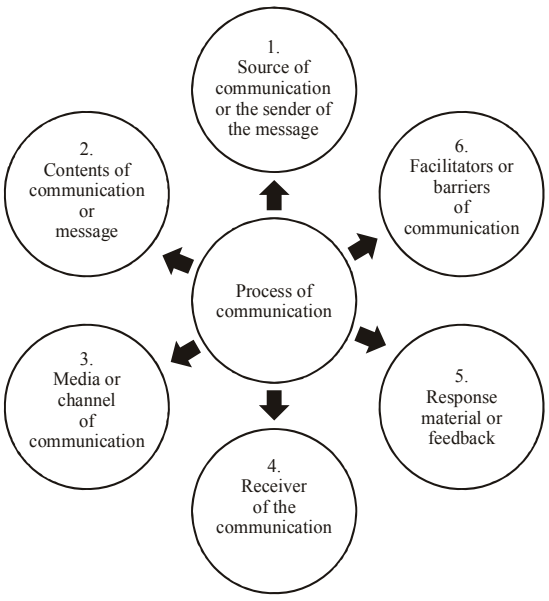
   _____

   _____

## 1.3 Components of Communication Process

Communication as a two-way process involving interaction between two or more persons (on giving and receiving ends) is carried out in a cycle.

We may notice the presence of six main components or elements in general in any process of communication. The six components are given as follows:



**The Source of Communication (The Communicator)**

The process of communication essentially starts with a source of communication. There must be somebody to initiate the process. This source, whether in the form of some object/event or person, must be in a position to transmit information, ideas, thoughts, opinions, feelings, etc. known or possessed by it with the other person or persons on the receiving end of the communication. It is generally named as 'sender' in the language of communication technology. In the teaching-learning process going on inside the classroom, the teacher is regarded as the sender of message whereas in any other communication or communication situation any source of knowledge (man or material) can be regarded as the source of communication.

A communication's effectiveness very much depends upon the strength and qualities of its source. As a student, you must have noticed that while some of your teachers are able to prove themselves as an effective source of communication, the others fail in such. What strength and qualities have you noticed in the successful communicators? Some of these may be (i) their proper knowledge of the subject matter, content or field of information, (ii) your own confidence in their knowledge and stock of information, (iii) their name and fame (credibility) as good teachers, (iv) their way of communicating and interacting with you, and (v) the impact of their overall behaviour and personality. In this way, the personality characteristics, and potential in terms of the content and presentation of communication count very much for the effectiveness of a person as a communicator. The teachers, lawyers' political and religious leaders, writers, actors, artists or any others who want to communicate their feelings, thoughts and ideas thus always try to imbibe all the essential virtues and qualities of an effective communicator.

An actor, actress or model dresses himself or herself in a way that may make him or her effective source of attraction. They give proper attention to their physical and mental health and many other observable personality traits to make them as the most appealing, attractive and acceptable source of communication. Afterwards, they try to say or show whatever is desired from them according to their roles and needs of the situation. If they are able to do so effectively, the purpose of their communication may be properly served, otherwise their name and reputation as a communicator get lowered day by day. A successful political leader may drift the opinion of the masses within no time in his favour through the magnetization effects of his personality, and by way of his communication. So is true with your teachers. A teacher proving as an effective source of communication may take you long with her/him quite effectively on the path of teaching – learning, take active part in acquiring the learning experiences and be able to achieve the desired learning objectives at your satisfaction. This is what a process of good communication aims to achieve and it can happen only through the presence of a proper communicator.

**Contents of Communication or Massage/Communication Material**

What is intended to be communicated or transmitted by the source, i.e. sender, from his own stock of knowledge, information, thoughts, opinions, feelings, etc to the other person or persons (receivers) is known as the contents of communication. These may be well organized and structured or unorganized and unstructured or spontaneous depending on the nature and purpose of communication and the media chosen or situation prevalent at the time of communication.

The effectiveness of a communication process in any classroom situation very much depends on the quality and nature of the communication material. If the content and message has some attraction, force and value to the receiver, it will surely catch his attention and make him quite attentive and an active participant in the communication process. On the contrary, if there is nothing new, novel or valuable in the message, i.e. the piece of instruction imparted by the teacher, it will neither attract nor motivate the students to take genuine interest for becoming active partner in the ongoing classroom communication. Therefore, it is the prime duty of all the communicators to think seriously about the quality and nature of the content material and the message given to the receivers. As far as possible, it should be quite relevant to their needs, interests, previous background, mental horizon and communication level. In brief, if there lays strength and effectiveness in the communication material, it will automatically penetrate into the eyes and ears of the receivers for the meaningful interpretation, understanding and responses on their part.

**Media and Channel of Communication**

What one wishes to convey to others is always communicated with the help of appropriate media or channel. The media in general takes the two distinctive forms- verbal (spoken or written words) and non-verbal (gestures, sign language, body language, morse code, etc.). In a communication process, both the sender and receiver are forced to make use of the media or channel of communication that is mutually acceptable as well as effective.

At the onset of any Communication process, when one as a source of the message tries to convey some information or own ideas, thoughts and feelings, he is in fact motivated to transmit it to the receiver. For this, he first tries to organize the Communication Material in proper shape and then searchers for an appropriate media, verbal or non-verbal.

He has to make use of a special transfer mechanism known as encoding (transfer of thoughts and feelings into widely accepted, agreeable and understandable verbal or nonverbal signs and symbols). For example, when one tries to convey his displeasure about something, he may use the distinctive language such as 'I don't like this' 'don't do this'or express it through non-verbal gestures and body movements. Further, for the actual physical

transmission of this symbolic expression, he may use a variety of channels. These channels of transmission are in fact nothing but the media or means which call for the use of our senses of sight, hearing, touch, taste, and smell. According to the demands of the situation and the effectiveness of communication, one may plan for the use of the appropriate verbal or non-verbal symbolism and sensory channel.

The intended encoded message travelling through the sensory channel then can move to the receiver. As it is encoded in a symbolic language, the receiver has to resort to its decoding for understanding its meaning, in the way as intended by the communicator.

The receiver after receiving the message then tries to respond. He now takes initiative for opening the channel of communication with the source. For transmitting his response or providing feedback, he also takes the help of encoding his response in the non-verbal or verbal symbols. This encoded response is then travelled through the sensory channels and reaches the sources which further decode it for getting the needed feedback for maintaining the desired flow of communication between him and the receiver.

The communication media or channel just lies in between the source and the receiver like a bridge or connecting link. What the source of communication says or shows to the receivers, can be done only with the help of some or the other verbal or non-verbal communication channel. The nature and quality of the traffic flowing on the bridge is very much dependent on the appropriateness, strength and quality of the bridge. Similarly, the effectiveness and the strength of the communication flow between the communicator and receiver surely depend upon the nature and quality of the verbal and non-verbal means, and the media and channels employed in the process of communication. For this purpose, the following things should always be kept in mind.

- Use the language that is quite known and understandable on the part of the receivers.
- The verbal means should be supported by the non-verbal clues, gestures, body language, physical movements, etc. for giving the required strength and effectiveness to the process of communication.
- To reduce the ill effects of verbalism, attempts should be made to make use of audio visual aid material and appliance suiting to the very nature and timings of the communication.
- The essential skills should be learnt well both by the communicators and the receivers for drawing the maximum advantage through the communication.
- As a communicator you never use that media or means for the communication that is not capable of conveying what is intended by

you. It should always be within the reach and comprehension of the receivers so that the chain of proper encoding and decoding can be continuously maintained.

- Have variety, novelty and creativity in making use of different means and media for the communication. Always prefer the multimedia approach over the single or the limited.

**Receiver of the Communication**

The receiver is the person who remains at the receiving end of the communication. He is to receive the encoded intended message of the source of communication, decode it for its proper interpretation and react or produce a desired response (feedback) to the source. In this way, the receiver like a far end pole is equally important for the flow of the current of communication between him and the communicator or the sender of the message. The communication can remain operative only if the receiver is interested and possesses the required competency to decoding, interpretation and understanding) in order to maintain the flow of communication.

The effectiveness in the flow is dependent much upon the quality and effectiveness of the contents. It is through feedback that one may evaluate the outcomes of his communication, i.e. what was intended to be communicated, it if has or has not reached the receiver, has there been any gap in the communication process, has there been any difficulty or misgiving in the interpretation of the message, etc. Thus, the quality of communication as a two-way process may thus be properly maintained through a proper feedback from the receiver and its subsequent follow up on the part of the sender.

Where the initiator or the source of communication is the communicator, the receiver lies on the other end for actualizing the process of communication. Actually, what is done through communication is always intended for the benefit of the receiver. A communication can only be carried out effectively with his active involvement and cooperation. In case he is not interested or not capable of receiving and understanding the meaning of the message or does not respond in a proper way for maintaining the flow of communication, the communication will turn into one-sided affair and thus lose its purpose and significance. In this way, the actual key of effective classroom communication lies with the receiver. If he has the characteristics of a good receiver, he may rise to the occasion for making the communication efforts of the communicator most fruitful and commendable in spite of the slackness, deficiencies and hurdles in terms of the use of proper media and channel of communication. These characteristics may be summarized as given below:

- The receivers must have sufficient previous knowledge and general background for receiving and understanding the communicated message.

- They must have the required proficiency and abilities in terms of communication skills such as listening, observing, reading, writing, speaking, mapping, drawing, measuring, surveying, thinking, analyzing, synthesizing, evaluating and drawing inferences.
- They must have the skill and potential required for the use of various modes, media and means of communication. Their sense organs should be well adapted to the use of various audio-visual aid material and appliances.
- They must remain quite alert and attentive for receiving the intended message and provide essential response for giving the required feedback to the communicator for carrying out the chain of communication.
- They must show proper zeal, enthusiasm, curiosity as well as need for maintaining the chain of communication.
- They must not put themselves into a passive recipient of the information or message given by the communicator but should make themselves enquirers and active partners in the process of communication.

**Facilitators and Barriers of Communication**

The effectiveness of communication very much depends on the presence or absence or the elements and conditions, facilitating or obstructing the proper flow of communication. In fact, these elements or situations effectively play the role of the intervening variables in helping or hindering the process of communication by standing between the communicator (independent variable or source) and the receiver (dependent variable.) In this way, these are always in a position to increase or decrease the effectiveness of the communicator, the strength of the communication media, the power of the receiver, and the quality of the communicated message by their typical nature and characteristics.

As a matter of common experience, we all are aware with the role of the physical and the psychological factors inherent in the environmental situations or conditions prevailing at the time of communication. The favourable situation such as calm and quiet environment, tension-free mutual interaction, proper climate and weather conditions, and proper facilities in terms of using multimedia may play wonder in enhancing the effectiveness of the communication process. On the other hand, unfavourable conditions or situations in the form of noise, indiscipline, improper physical facilities, non-availability of appropriate aid material, mutual conflicts and tensions, improper climate and weather conditions may play havoc by disharmonizing the process.

As a communicator, receiver or organizer of the show of communication, we must be fully aware of the nature and effect of the

facilitators and barriers of communication. As we know, the facilitators are the friends or companions of all the factors and things that cater for the effectiveness of communication. These should be, therefore, provided due encouragement and, incentives. One should always try to have provision for as many facilitators as possible. However, on the other hand, the barriers must be taken as the negative and detrimental force and, as such, every effort should be made for keeping them totally away or reducing their impact on the communication process. These barriers may diminish and distort the quality of the signals sent and received by the persons connected with the process of communication. We shall now try to identify and name these barriers.

**Internal Barriers**

The roots of the internal barriers of communication lie in the sender and the receiver of the message. These are:

1. Poor physical health or illness
2. Poor background in terms of previous learning and general knowledge about the subject of communication
3. Poor mental health and improper psychological makeup such as prejudices, non-attention, feeling of insecurity, anxiety, depression, and dissatisfaction
4. Handicap in understanding the symbolic expression, verbalism, graphical representation, etc.

**External Barriers**

The roots of the external barriers of communication lie in the environmental conditions prevailing at the time of communication. These conditions can be:

1. Noise and other similar distracters
2. Polluted environment
3. Invisibility
4. Environmental and physical discomfort
5. Improper functioning of the communication channels involving audio-visual materials and equipment
6. Non-cooperative or unhealthy rivalries and competitions among the participants
7. Lack of proper motivation, incentives, zeal and enthusiasm needed to remain active on the part of the sender and the receiver

**Check Your Progress–2**

1. List the components communication process.

   _____

   _____

2. Who is the 'receiver' of the communication?

   _____

   _____

## 1.4 Verbal and Non-verbal Communication

Let us study about verbal and non-verbal communication under this section.

### 1.4.1 Verbal Communication

Language is the key and the base of any verbal communication. Each society develops one or more forms of languages with spoken or written words for communicating with each other. Accordingly, we have local, regional, national and international language for the required communication. The basic units of any language are words and sentences which are governed by the rules of the grammar. Language can make use of one of the three forms: (i) oral, (ii) written (iii) oral and written. In the oral form, one can communicate one's feelings, thoughts and intentions to others by the speaking and listening channel. For this purpose, the sender/communicator makes use of some precise and distinct sounds which when heard by the receiver, are decoded for understanding their meaning.

In the written form of language communication, the communicator/ sender makes use of the script of the language such as Assamese for Assamese language, Devnagari for Hindi and Gurumukhi for Punjabi. For the communication of thoughts and feelings one writes about it through some written mode, pencil, paper or chalk, board or print media and the person at the receiving end understands the meaning of the communicated message through its reading and decoding.

In the usual classroom communication, a teacher while writing on the blackboard also makes use of language for the classroom communication, a teacher while writing on the blackboard also makes use of language for the explanation and exposition of the written contents.

### 1.4.2 Non-Verbal Communication

The communication process can also be carried out without the use of any verbal means. In many cases, (such as communication with deaf and dumb, mentally retarded, the persons not knowing the language of the sender or sending a secret message in the commonly coded and symbolic expression), it may become a necessity as well as compulsion to make use of the non-verbal communication. In the normal situations also the non-verbal media is generally used for giving strength and effectiveness to the verbal communication. Components of non-verbal communication are discussed as follows:

- Proxemics: The study of space in interpersonal communication.
- Chronemics: The study of time factor.
- Paralanguage: The study of voice quality and variety.
- Haptics: The study of touch.
- Oculesics: The study of eyes.
- Kinesics: The study of body language.

You will now be able to comprehend the various elements of non-verbal communication given in brief in the following paragraphs. An elaborte explanation of kinesics, however, is given in subsequent sections.

#### Proxemics

Proxemics is the study of perceptions of people on physical space and its use by them. Aggression is caused by power. Those who like to be powerful occupy larger space. Large office rooms, big cars, large tables and large quarters are high-status indicators.

Based on the concept of territory, Edward T.Hall developed proxemics during the 1950s. Hargie and Dickson (2004, p. 69) identified four types of territories as shown in Table 1.1.

***Table 1.1*** *Types of Territories*

| S. No. | Classification | Description |
|---|---|---|
| 1 | Primary territory | One's own area; entry to others with permission only,e.g., Own office cabin. |
| 2 | Secondary territory | No 'right' to occupancy,but routine use gives attachment, e.g., a seat in the bus,usually occupied. |
| 3 | Public territory | Area, which is given to all, for sometime, e.g., parking space. |
| 4 | Interaction territory | Space created by others when they are interact. |

#### Chronemics

Chronemics studies the use of time in non-verbal communication. Time is an important determinant of a person's image.

*Punctuality*: If a person is punctual, he is rated efficient and organized. However, late coming is common in case of guests. Making people wait is considered a status symbol in their case.

*Speed of action*: The timing of an action is important. Dynamic managers make quick decisions and implement them fast. Participative managers take time to decide as it requires contribution by all participants.Some managers are slow in decision-making. It signifies conservative attitude or laziness of the decision maker.

*Frequency of an action*: If an individual is frequently absent, he or she is called chronic absentee,whereas if a person is absent now and then he/she is not labelled for this behaviour. Thus, frequency of an action is also an important factor in explaining behaviour.

## Paralanguage

Also referred as *vocalics*, paralanguage is the study of non-verbal cues of the voice. These cues include the acoustic properties of speech, namely tone, pitch and accent, together called prosody. Paralanguage can emphasize or change the meaning of words.

A classification method that comprised the voice set, vocalization and voice qualitieswas advanced by George L.Trager. Table 1.2 shows the classification of voice system.

***Table 1.2*** *Classification of Voice System*

| S. No. | Classification | Description | Elements |
|---|---|---|---|
| 1 | Voice set | Context of speech | Situation, gender, mood, age and a person's culture. |
| 2 | Voice qualities | Which give each individual a unique voice print | Volume, nasality, tempo, resonance, rhythm, articulation, pitch and accent. |
| 3 | Vocalization | Characterizers | Emotions expressed while speaking like laughing, crying and yawning |
| | | Voice qualifier | The style of sending a message, e.g., yelling |
| | | Vocal segregates | Such as ‘uh-huh’ to indicate listener is listening |

## Haptics

The study of touching behaviour as non-verbal communication is known as haptics. Different touches are:

- Handshakes: Shaking hands to greet a person.
- Kissing: Lip touch on lip,cheek or hand top signal welcome or love.
- Slapping: Soft slap shows initimacy, hard slap shows anger.
- Patting: On the back,on the cheeks, etc., indicate appreciation.
- Scratching: Scratching head indicates doubt.

The background of the situation determines the meaning conveyed from a touch, including the way one is touched and the personal dynamics between communicators.

### Oculesics

It refers to the role of eyes in non-verbal communication. Eye contact shows attention, interest, and involvement. Glancing indicates passing interest whereas gazing indicates intense interest. Staring is interpreted as anger or confusion. Blinking indicates ignorance.

### Kinesics

The study of body movements, facial expressions and gestures is called kinesics. It is the non-verbal behaviour of the whole or part of the body. It examines and interprets behaviour, such as mutual gaze, smile, facial warmth or pleasantness, etc. Ray L. Birdwhistell, a ballet dancer who later on became an anthropologist, advanced this concept in the 1950s. He wanted to understand how people interact with gestures, stance, posture, etc. As phoneme is known as a unit of sound, kineme is the unit of body movement. However, many people prefer the term body language to denote kinesics.

### Important modes of non-verbal communication

### Facial Expression

Facial expression may very well communicate the feelings, thoughts and intentions of the communicator. In general, face and facial expressions may be said to be a true index of one's emotional and thinking behavior. When one is perturbed, his face gives the identity of the level of the anxiety and stress. Similarly, when one is in a happy or joyful mood, his or her expression is almost similar and universal to all round the world. Seeing the facial expression, we can easily conclude if one is angry, fearful, jealous, astonished or showing love, sympathy or hatred. In this way facial expression may be termed as one of the important modes of non-verbal communication.

### Language of the Eye

Language of the eye may be considered as another important mode of non-verbal communication. Eyes, in fact, may convey all what is intended to be communicated by the communicator. Language of the eye may also be considered as common and universal to almost all cultures and societies of the world. The various idioms and phrases showing movements and actions of the eyes like 'Aankh Bichhana' and 'Ankhe Dikhana' easily provide valid testimonial of its role in communication.

The language of the eye movements is somewhat so universal and familiar that it is very easy and simple to decode the feelings, thoughts and intentions conveyed by the communicator. When one turns his eyes, we can

conclude that he is not interested in our friendship or conversation or wants to avoid us. Similarly, one can communicate well his emotion of fear, jealousy, anger, enjoy, hatred, greediness, temptation, lust, love, affection, apathy or sympathy etc. through the eye language.

Actually eye-to-eye contact forms the very basic of effective communication. When one focuses his eyes for having eye-to-eye contact with you in conversation, it means that he thinks you quite important for conversation. However, the way he gazes may convey his liking or disliking for you.

In the classroom communication, the necessary interaction links between the teacher and pupils are mostly maintained through the related eye language. The eye movements of the teacher may encourage a student in giving response or participating actively in any teaching -learning activity. Similarly, by reading through eye movements, the teacher can know whether the student is showing interest or disinterest in any classroom activity.

**Body Language**

Our body has an impressive and effective language for communicating our feelings, thoughts and actions. A classical dancer while performing on the stage may provide a substantial proof of the effectiveness of such communication through various gestures, postures and movements of her body parts. By seeing the body language, you may well conclude that now she is offering prayers, getting annoyed, nervous, tensed or feeling shyness, fearful, angry, jealous, envious, anxious, in love, or affection.

The body language, although seems to be somewhat universal and common, yet has a perfect cultural and social base. As a result every culture or society has its own body language which can be learnt the same way as the spoken language. Hence, one should be quite cautious while making use or interpreting of body language in communication. Let us cite a few instances for this purpose:

- In Tibet, the tribal people exchange greetings by protruding their tongues. In India, it will be communicated as insulting and teasing to the receivers.
- In India, you may use your stretch open palm for conveying the stop signal. However, doing such in Greece will be an outright insult to the receivers.
- In the western culture, the people may welcome or greet through kissing, whereas kissing in public is not liked in India. We usually welcome or greet through joining hands, touching feet or shaking hands, etc.

The body language in its broad form may include various types of gestures and physical movements of the body parts. In such a broad form,

it is quite commonly used by all speakers, stage or media actors, political and religious leaders, lawyers and advertising models while giving their performances at their workplaces. In our day – to – day conversations, we all are quite habitual to make use of it for communication. We convey the feelings of respect to our elders by touching their feet, welcome through joining our hands or say goodbye by shaking or raising our right hand. Our body speaks about our feelings of anxiety, fear, anger, happiness, sadness, affection, hatred, empathy and sympathy through its various actions and movements. The body language can be very effectively used by the teachers and pupils in the classroom for the healthy classroom interaction in almost all types of teaching- learning situations. The teachers may add colours and effectiveness to their explanations, expositions and demonstration skills, with the use of appropriate body language.

**Sound Symbols**

Many sound symbols and vocal cues also prove an effective medium for the desired communication. For example, when we are saying, narrating or explaining something to somebody and he is responding simply by uttering the sound hunh-hunh-hunh, it may work well for maintaining the chain of communication. We may properly visualize that he is paying attention and agreeing to the message communicated to him. Contrarily, when the listener utters the negative sound 'unu hunch' it means his disinterest or disagreement to the conveyed message. It becomes more distinctive and prominent when he also nods his head and neck along with the utterance of the negative sounds. Similarly, the utterance of the sound 'uanh' accompanied with the turning of the neck and twisting of the may provide a signal of one's complete disliking or even feeling of hatred.

In addition to playing the role of a mediator or reinforce in conversation, the sound symbols or vocal cues may effectively act as potent carrier and conveyer of one's thoughts and actions. For example, when one is making a pleasant sound through whistling or humming we may know that he is in a pleasant and happy mood and when one utters 'hunn' with anger he is said to be in angry or fighting mood. However, the interpretation of the sound symbols can only be made in context to the tone, volume and the situation prevailing at the time of the utterances of these sounds, i.e. whistling may be made to tease, attract and making indecent remarks to somebody.

**Symbolic Code Language**

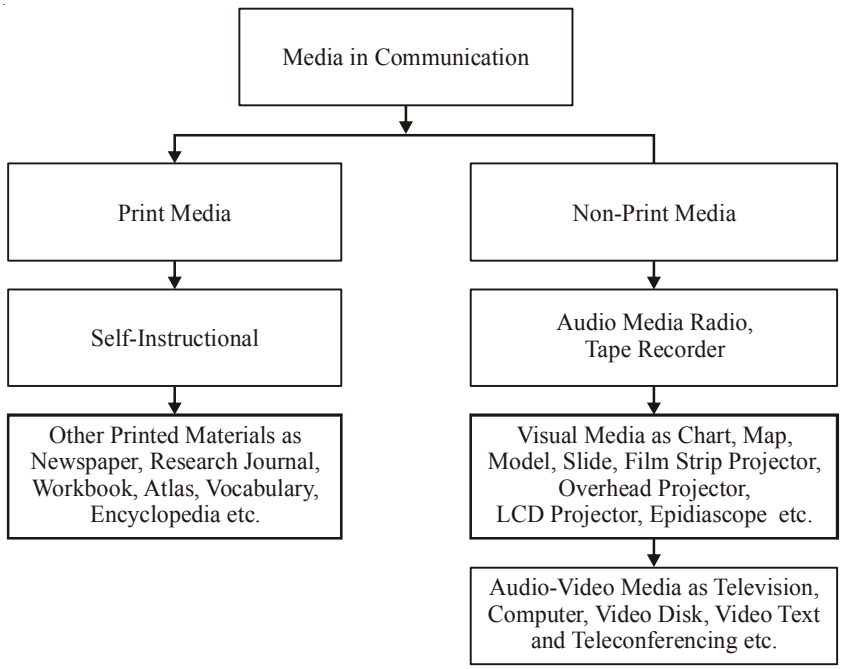
Many times some special code language can also be used as an effective mode for the desired communication. The special code language prepared through the help of various gestures, postures and body movements can be used for communicating with the deaf and the dumb. You may very well judge the effectiveness of such communication if you have ever seen the telecasting

of the news bulletin specially meant for the deaf and dumb population. One can also mix vocal cues and sound symbols with the body language for having a code language. Since it is to be commonly shared, it must be well understood, used and interpreted in any form by its users. The users (senders and receivers) thus are free to invent any set of code language using any type of verbal and non-verbal symbols commonly shared among them.

In our day–to-day life also, we must have heard some groups of children or youngsters often talking to each other in their own code languages. During the games different team members uses the code language to give instruction or message to other team members. You may feel helpless in making any sense of their communication but they have their language for proper communication. Similarly, various types of well-thought and organized code languages are very effectively used in exchanging quite meaningful and secret information by the detective and security agencies operating all over the world. In this way, any commonly shared code language may prove an effective mode for the desired communication between the shared group members.

### Print and Non–Print Media in Communication

Both print and non-print media are used in the communication process. Both these media can be classified as per the following diagram:



**Check Your Progress-3**

1. What is the importance of non-verbal communication?

   _____

   _____

2. List some of the important modes of non-verbal communication.

   _____

   _____

## 1.5 Teaching

Teaching is considered as a social phenomenon. Teaching is an art in which a teacher influences his students and motivates them for learning. Students learn and develop according to the ideals set before them by teachers. Teaching is nothing but an organized set of activities, as a result of which pre-determined objectives are achieved. The success of teaching process depends upon the sincerity and hard work of teachers. Communication plays a big role in teaching as the whole process of teaching involves various forms of communication.

### 1.5.1 Definitions of Teaching

A few popular definitions of teaching are as follows:

- In the words of Brubacher (1939): 'Teaching is an arrangement and manipulation of a situation, in which there are gaps or obstructions which an individual will seek to overcome.'
- According to Morrison (1934): 'Teaching is an intimate contact between a more mature personality and a less mature one, which is designed to further the education of the latter.'
- According to Smith (1961): 'Teaching is a system of actions intended to reduce learning.'
- According to Clark (1970): 'Teaching refers to activities that are designed and performed to produce change in student behaviour.'

### 1.5.2 Assumptions of Teaching

Some assumptions of teaching are as follows:

(i) The teacher is a professional who is capable of making rationale, humane and creative decisions.

(ii) The primary purpose of teaching is to facilitate student learning.

(iii) Student learning can be measured only through observations that reveal changes in behaviours.

(iv) The act of teaching is a complex process that is influenced by a field of forces, of which teachers can be aware only in part and which they can only partially control.

(v) Teaching is an activity that can be described and analysed.

(vi) Teachers should teach objectively and enable students to evaluate their teachings.

### 1.5.3 Characteristics of Teaching

According to the definitions and assumptions of teaching, the characteristics of teaching can be interpreted in the following ways:

(i) Teaching is an interactive process between a teacher and a learner. It is not a one-sided affair as both the learner and the teacher have to be fully active during this process.

(ii) Teaching is not an independent activity as it cannot happen in vacuum. It takes place in some social set-up where the teacher aims at modifying the behaviour of an individual or group.

(iii) Teaching is both formal and informal. Both the ways, it helps in achieving desired goals.

(iv) The process of teaching is carried out to achieve some specific aims and objectives.

(v) Teaching is a cooperative activity and a teacher should involve students in different classroom activities such as organization, management, discussion, recitation and evaluation.

(vi) Teaching is dominated by the process of communication. Good communication skills make teaching interesting and lively.

(vii) Teaching is not only about motivating students to learn, but also enabling them to learn in a manner that is relevant, meaningful and memorable.

(viii) The main aim of teaching is to provide guidance to learners, according to their capabilities.

(ix) The purpose of good teaching is to develop independence of thought, self-reliance and confidence among students.

(x) Teaching is a tri-polar process and its three poles are: teaching objectives, learning experiences and behaviour modifications.

(xi) Effective teaching provides feedback for both students and teachers.

(xii) Teaching is remedial and the teacher must solve the problems of students.

(xiii) Teaching is an observable, measurable and modifiable process. A teacher's behaviour can be observed and measured with the help of various supervisory techniques and their analysis.

(xiv) Teaching is a well-planned activity and teachers plan the objectives, methods of teaching and evaluation techniques in advance.

(xv) Teaching is a democratic process as it provides the learner with an opportunity to present his view.

### Check Your Progress-4

1. Define teaching.

   _____

   _____

2. List at least five characteristics of teaching.

   _____

   _____

## 1.6 Let Us Sum Up

- Man is a social animal and his ability to communicate is the prime factor that distinguishes him from other animals. Apart from basic necessities, one needs to be equipped with good communication skills.
- Communication, derived from the Latin word '*communicare*' which means 'to share', is the process of transmitting information and understanding.
- W.H. Newman and C.F. Summer Jr. defined communication as, 'an exchange of facts, ideas, opinions or emotions between two or more persons'.
- Communication always takes place within a context. The context of communication has at least four dimensions. They are: (i) physical (ii) social (iii) psychological and (iv) temporal. These dimensions interact and influence, and are influenced by one another.
- Communication is a very important aspect of human life because it is only through communication that human beings can interact with each other as individuals and as independent groups. Communication skills can be used virtually in every field.
- We may notice the presence of six main components or elements in general in any process of communication:
  (a) Source of communication or the sender of the message
  (b) Contents of communication or message
  (c) Media or channel of communication

(d) Receiver of the communication

(e) Response material or feedback

(f) Facilitators or barriers of communication

- The process of communication essentially starts with a source of communication. There must be somebody to initiate the process.
- In the teaching-learning process going on inside a classroom, the teacher is regarded as the sender of message whereas in any other communication or communication situation any source of knowledge (man or material) can be regarded as the source communication.
- A communication's effectiveness very much depends upon the strength and qualities of its source. As a student, you must have noticed that while some of your teachers are able to prove themselves as an effective source of communication, the others fail.
- What is intended to be communicated or transmitted by the source, i.e., sender, from his own stock of knowledge, information, thoughts, opinions, feelings, etc. to the other person or persons (receivers) is known as the contents of communication.
- The effectiveness of a communication process in any classroom situation very much depends on the quality and nature of the communication material.
- What one wishes to convey to others is always communicated with the help of appropriate media or channel. The media in general takes the two distinctive forms—verbal (spoken or written words) and non-verbal (gestures, sign language, body language, morse code, etc.)
- The effectiveness in the flow is dependent much upon the quality and effectiveness of the contents. It is through feedback that one may evaluate the outcomes of his communication.
- Where the initiator or the source of communication is the communicator, the receiver lies on the other end for actualizing the process of communication.
- The effectiveness of communication very much depends on the presence or absence or the elements and conditions, facilitating or obstructing the proper flow of communication.
- As a communicator, receiver or organizer of the show of communication, we must be fully aware of the nature and effect of the facilitators and barriers of communication.
- Language is the key and the base of any verbal communication. Each society develops one or more forms of languages with spoken or written words for communicating with each other.

- Language can make use of one of the three forms: (i) oral (ii) written (iii) oral and written.
- The communication process can also be carried out without the use of any verbal means. In many cases, it may become a necessity as well as compulsion to make use of the non-verbal communication.
- Facial expression may very well communicate the feelings, thoughts and intentions of the communicator.
- Body language of the eye may be considered as another important mode of non-verbal communication. Eyes, in fact, may convey all what is intended to be communicated by the communicator.
- In the classroom communication, the necessary interaction links between the teacher and pupils are mostly maintained through the body language of the eye.
- The body language, although seems to be somewhat universal and common, yet has a perfect cultural and social base. As a result every culture or society has its own body language which can be learnt the same way as the spoken language.
- Many sound symbols and vocal cues also prove an effective medium for the desired communication.
- Teaching is considered as a social phenomenon. Students learn and develop according to the ideals set before them by teachers.

## 1.7 Key Words

- **Communication:** It is a process of sharing thoughts, ideas and feelings from one person to another.
- **Contents of communication:** What is intended to be communicated or transmitted by the source to the other person or persons (receivers) is known as the contents of communication.
- **Entertainment:** To break away from the daily schedule of life, entertainment is a crucial part of everyone's life. Nowadays, every source of entertainment like movies, music, television shows, games, theatre or even anecdotes narrated by people involve communication.
- **Discussion:** The processes of debating and discussing elucidate various perspectives on matters that are of interest to people. With the help of communication, the reasons for difference in opinions and imparting of new ideas to others can be pinpointed.
- **Teaching**: An organized set of activities, as a result of which pre-determined objectives are achieved.

## 1.8 Terminal Questions

1. Discuss the significance of communication.
2. Explain the components of communication process.
3. What are the roots of the internal barriers?
4. Write a brief note on verbal communication.
5. 'One should be cautious while interpreting body language'. Explain why? Give examples.
6. How does 'sound symbols' help in the process of communication?
7. What are the assumptions of teaching?
8. Distinguish between independent variable and independent variable.

## 1.9 Suggested Reading

Ellington, Henry, Fred Percival and Philip Race. *Handbook of Educational Technology*. London, UK: Kogan Page.

K. Barlo, David. *The Process of Communication: An Introduction to Theory and Practice.* California, US: Holt, Rinehart and Winston.

Joyce Bruce R., Marsha Weil. *Models of Teaching*. New York, US: Pearson.

Das, B.C. *Educational Technology*. New Delhi : Kalyani Publishers, 1999.

Das, R.C. *Educational Technology*, New Delhi : Sterling Publishers, 1993.

Sharma, R.A. *Technology of Teaching*: Meerut: International Publishing House.

## 1.10 Model Answers to 'Check Your Progress'

**Check Your Progress-1**

1. According toMartin P. Andersen, communication can be defined as 'the process, by which we understand others and in turn, endeavour to be understood by them. It is dynamic, constantly changing and shifting in response to the total situation'.
2. Some of the most important characteristics of communication are as follows:
   - **Purposeful:** Communication always involves a purpose. Whenever an idea or thought arises in the mind of a sender, he wants to communicate it. This mean there is always some purpose behind it. The purpose of communication is to impact attitudes and behaviour of those involved.

- **Universal:** Communication is the only way through which human beings can share information. Thus, communication is a universal process as it occurs almost everywhere.
- **Interactive:** Interaction is the primary characteristic of communication in which two or more persons or groups interact with each other. It may result in social interaction. Thus, it is a two-way dynamic flow of information.

**Check Your Progress-2**

1. The components of communication process are as follows:
   - Source of communication or the sender of the message
   - Contents of communication or message
   - Media or channel of communication
   - Receiver of the communication
   - Response material or feedback
   - Facilitators or barriers of communication
2. The receiver is the person who remains at the receiving end of the communication. He is to receive the encoded intended message of the source of communication, decode it for its proper interpretation and react or produce a desired response (feedback) to the source.

**Check Your Progress-3**

1. Non-verbal communication is required in many cases, such as communication with deaf and dumb, mentally retarded and the persons who do not know the language of the sender. In the normal situations also, the non-verbal media is generally used for giving strength and effectiveness to the verbal communication.
2. Some of the important modes of non-verbal communication are:
   - Facial Expression
   - Language of the Eye
   - Body Language
   - Sound Symbols
   - Symbolic Code Language

**Check Your Progress-4**

1. Teaching is an art in which a teacher influences his students and motivates them for learning. Students learn and develop according to the ideals set before them by teachers.

2. Five of the key characteristics of teaching are:
   (i) Teaching is an interactive process between a teacher and a learner. It is not a one-sided affair as both the learner and the teacher have to be fully active during this process.
   (ii) Teaching is not an independent activity as it cannot happen in vacuum. It takes place in some social set-up where the teacher aims at modifying the behaviour of an individual or group.
   (iii) Teaching is both formal and informal. Both the ways, it helps in achieving desired goals.
   (iv) The process of teaching is carried out to achieve some specific aims and objectives.
   (v) Teaching is a cooperative activity and a teacher should involve students in different classroom activities such as organization, management, discussion, recitation and evaluation.

# Unit-2
# BARRIERS TO EFFECTIVE CLASSROOM COMMUNICATION

**Structure**

2.0 Objectives
2.1 Introduction
2.2 Barriers to Communication
2.3 Barriers to Effective Classroom Communication
2.4 Guidelines for Better Communication in Classrooms
2.5 Let Us Sum Up
2.6 Key Words
2.7 Terminal Questions
2.8 Suggested Reading
2.9 Model Answers to 'Check Your Progress'

## 2.0 Objectives

After going through this unit, you will be able to:

- Identify the barriers to communication
- Highlight the various types of barriers
- List various barriers to effective classroom communication
- Explain the guidelines for better communication in classrooms

## 2.1 Introduction

In the previous unit, you have learnt about communication, its different components and types. Besides, you have also studied in detail about verbal, non-verbal communication and teaching. In this unit, you will learn about different types of barriers that hinder the process of communication.

Barriers to communication have made the process of communication complex, difficult and frustrating. Communication is effective if it flows freely through an appropriate medium between the sender and the receiver. Free flow means uninterrupted transmission of information or message, correct comprehension of the message by the receiver, and relevant and appropriate feedback from him. Problems with any one of the components of communication can become a barrier to communication. Barriers to communications range from simple distracting noises to complex psychological factors.

This unit will also introduce you to different guidelines that will help in improving communication process.

## 2.2 Barriers to Communication

The quality and effectiveness of the process of communication is affected favourably or adversely through the presence of some other intervening variables lying between the source of communication and the receiver. These variables according to their nature helping or obstructing the path or communication may be termed as facilitators or barriers of communication. The presence of congenial, physical, psychological and environmental conditions and facilities available for effective communication may facilitate and help in providing the desirable effectiveness to the communication system. Barriers may cause simple communication gaps or total failure of communication. Some major barriers of communication are as follows:

(i) **Lack of common language:** Language uses oral or written symbols to transmit messages from one person to another. If the sender and the receiver of a message do not belong to the same language group, then this deficiency will pose as an obstacle to the process of communication. The sender and the receiver will not be able to communicate with each other if they do not know a common language. Communication will not be possible between a boy who can only speak in English and another boy who can only speak in French.

(ii) **Semantic barrier:** It is possible for one word to have many different meanings. It is not necessary for the meaning that is ascribed to a word by the communicator to be the same as that ascribed by the receiver to the same word. One word can have different meaning for different people at different points of time. Hence, it is possible that the sender and the receiver, most of the time, ascribe different meanings to the same word. Occasionally, they might possibly make use of dissimilar words to communicate the same meaning.

(iii) **Poor listening:** Poor listening skills are one of the chief problems when communicating. If people are attentive in listening to the message, a lot of misunderstanding can be reduced. A large number of people do not pay value added attention to the message because of a variety of disturbances, feelings, enthusiasm, absence of interest, unwarranted assertiveness and roving concentration. This usually leads to misunderstanding and conflict.

(iv) **Poor vocabulary:** Low level of vocabulary is an obstacle to the communicator in conveying the message in its exact form. It makes the message more complicated and reduces its effectiveness. If the recipient cannot figure out the words, he will not be able to comprehend the sentences.

(v) **Noise:** A lot of noise also affects communication. Noise is usually, but not always, in the form of sounds. It can be visual, audiovisual, written, physical or psychological. Noise, in a physical form denotes the loud noise made by machines or speaker or other such things. Noise occurs when a student arrives late for a class and his arrival becomes a source of distraction for others in that class. Bad handwriting and incorrect typing leads to written noise. Psychological noise refers to mental trouble and turmoil, inattentiveness and indifference.

(vi) **Time:** Time factor may also hinder the process of communication. For example, a phone call at midnight may irritate the receiver and he may not listen to the communicator. Thus, his communication becomes ineffective. The best of communication may prove to be ineffective if it does not take place at the right time.

(vii) **Distance:** The distance between one who communicates the message and one who receives it may be a strong obstacle to communication. This can be due to absence of technical equipment such as telephone, telefax, etc., for linking them. An unfavourable system of seating in the classroom can give rise to a type of communication gap, which can be eradicated by making adjustments in the distance.

(viii) **Attitudes and values:** People interpret message on the basis of their attitudes and values. If a message is adverse for the receiver, it will not be able to persuade him easily. Thus, personal attitudes, values and opinions are transformed into obstacles, in the process of effective communication. Negative attitude of a teacher or a student may affect communication in the classroom.

(ix) **Emotional barrier:** Emotions refer to the way we feel about the world around us. Constructive emotions like happiness, adoration or liking make the flow of communication smooth. However, negative emotions like fear, distrust, anger, anxiety and hatred, work as powerful hindrances to efficient means of communicating.

(x) **Different perceptions:** Different perceptions of different people have their own limitations. According to Francis Bacon, 'man prefers to believe what he prefers to be true'. Our reality is created by us with the help of selective perception. This conceals specific things that are present and reveals other more specific things, in addition to those which are already present. Every person's experience and his way of interpreting things are never the same since every person has perception his own. A communication barrier emerges, when the same object or concept is interpreted differently by two or more people.

(xi) **Wrong channel:** At times, simple rules for selection of a channel cause more problems than they solve. In selection of a channel, the sender needs to be sensitive to things like complexity of message,

consequences of a misunderstanding, knowledge, skills and abilities of the receiver and timely response on receiving the message.

(xii) **Poor retention:** There is a limit to the functioning of human memory. Everything that is said cannot be always retained. The retention is even lower if the receiver is not interested or attentive. This causes a breakdown in the process of communication.

(xiii) **Closed mindedness:** It is not at all easy to communicate with a person with intense prejudice. This type of a person is not ready to receive any message on a subject about which he believes that he knows everything. His mind is closed to new ideas, facts and proposals. Hence, he completely rejects the information and recommendations of the communicator, even before he knows the real facts.

(xiv) **Physical distractions:** Physical distractions are physical things that interrupt communication. For example, uncomfortable seating arrangement makes it difficult for a learner to concentrate on the communication.

(xv) **Lack of proper feedback:** Without feedback, communication is one-way. Feedback in terms of proper motivation, incentives, zeal and enthusiasm is needed on the part of the sender and the receiver. If, in a classroom the teacher is not getting feedback of his teaching, he may never achieve the actual goal of teaching.

(xvi) **Too much information:** Excess of information also acts as communication barrier. A lot of information faces many drawbacks and different respondents react differently to filter the information and receive only what they need. Hence for effective communication, the amount of information can be reduced.

### Check Your Progress-1

1. What do you understand by 'semantic barrier'?

   _____

   _____

2. How does human emotion affect communication process?

   _____

   _____

## 2.3 Barriers to Effective Classroom Communication

Sometimes obstructions are confronted in communication, as a result of which the transmitted message either goes wrong or received incompletely. Sometimes,

communication relations are broken down. Among other types of barriers are included: a message being misread, a message having more than one meaning, deformities in a message, limitations of the message-receiver, shortcoming in the communication channel, sound pollution etc.

Dr Kumar (1996) has tabulated the chief barriers in communication as follows:

**Barriers in Communication**

| Types of Barriers | Barriers |
|---|---|
| Physical barriers | Noise, invisibility, environment and physical inconveniences, poor health, lack of attention |
| Linguistic barriers | Verbose, unclear words, unnecessary words, grinding words, wrong pronunciation, unclear graphics and symbols |
| Psychological barriers | Prejudice, disinterest, wrong perception, unrewarding experience, more than necessary anxieties, incomplete curiosities |
| Background barriers | Previous learning, cultural discrimination, previous work situation and environment |

According to another scholar, barriers of communication can be classified into three types:

1. Barriers related to message-sender
2. Barriers related to message transmission
3. Barriers related to message-receiver

These barriers and difficulties can be classified in another way into the following types:

1. Linguistic barriers
2. Technical problems related to transmission
3. Problems related to the process of mutual influence
4. General problems related to transmission

**Some Barriers**

**(i) Noise:** Noise is a great barrier, Many times a message is lost in the noise, and it may be received incorrectly. Here, noise becomes a barrier.

**(ii) Language:** A word may have several meanings. Therefore, the use of word should be clear as to its context and place, else there may be misunderstanding.

**(iii) Previous Experience:** Sometimes we try to understand a stimulus on the basis of our past experiences. These past experiences are related to our background. Background experiences, needs, values and stimuli play an important role in encoding and decoding of a message. Sometimes the background experiences, needs, stimuli and

values are very helpful in understanding a message correctly, and sometimes they become a barrier in understanding a message correctly.

**(iv) Emotions and Sentiments:** Different types of reactions occur in the mind on listening different types of words. These reactions depend on our emotions and sentiments. Favourable words give us good reactions and unfavourable words give incorrect reactions. Incorrect reactions result in misreading of the message. Thus, emotions and sentiments function like a barrier in the communication process.

**(v) Situational Context:** When a word, sentence or phrase is seen out of its context, then its sense undergoes a change, and the right meaning is lost. In such a situation, a message gives a wrong meaning. Therefore, it is necessary to look at a message in the right context; else it will work as a barrier in the communication process.

## 2.4 Guideline for Better Communication in Classrooms

Effective communication is the essential requirement for having an effective interaction or getting maximum advantages from the process. In this way, the degree of its effectiveness can be judged from the amount of advantages drawn through it.

Now the question arises what should be done for realizing the utmost effectiveness in communication. The answer is very well linked with our attempts in improving each component or element involved in the process of communication. Let us think over the ways and means to bring efficiency in the nature and working of these components.

Following aspects should be given attention in order to overcome barriers in communication in order to effect an effective communication:

(i) As far as possible, clear, simple and comprehendible language should be used.

(ii) A message should be so written that the message–receiver can understand it well.

(iii) If there is a need to lay stress on a certain point, then this can be repeated, but to a certain extent.

(iv) More than one channel can be used simultaneously or one after another.

(v) There should be provision for feedback, only then it can be ascertained whether the message has been transmitted in the real sense.

(vi) The elements delaying the process of communication should be paid attention to.

(vii) The habit of listening should be cultivated. For it, the following points should be looked into:

(a) It is wrong to guess the message in the envelop by looking at the message-carrier or its envelop. The habit to listen to the message or message-carrier should be cultivated.

(b) More attention should be paid to the facts mentioned in the message as compared to the views on it.

(c) If some point has not been cleared in the class, then the problem should be presented at the end of the class instead of asking it immediately, so that the teacher can be heard without any interference from beginning to end.

(d) Listen carefully. Don't give a false impression of listening to the speaker.

(e) While listening, do not pay attention to other visuals or noise etc.

(f) Whatever you are listening, listen it completely and attentively.

(g) When you are asked something, listen properly and then answer. It is not good to guess.

(h) Attention should be paid to the speaker's facial expressions, voice, rate of speaking etc.

(i) Cultivate the habit of listening actively.

(j) Keep in mind, a good listener is able to transmit well.

(k) The message of the speaker should be heared attentively.

(l) If somebody is speaking loudly in the proximity and you are facing difficulty in listening, tell him to shut up.

(m) Never think that what the speaker is telling is already known to you. Even if you know it, listen attentively; it may be possible that you may get some new message in it which you did not know before.

(n) Listen to the speaker attentively, think over it and try to find out its inner, intended and deep senses.

(o) If you are asked a question, listen to it attentively and then determine what answer you will like to give. Your answer should be given in simple and correct language.

(p) When you listen, listen mindfully, actively and keep noting the important points in brief.

(viii) Read the written message well. If need be, read it again. Then ask yourself the following questions:

(a) What is being said in the message?

(b) What is the purpose of the message?

(c) What has been said at different points in the message?

### Check Your Progress-2

1. List the four chief barriers in communication.

   _____

   _____

2. Identify some of the important points to improve listening habit.

   _____

   _____

## 2.5 Let Us Sum Up

- The quality and effectiveness of the process of communication is affected favourably or adversely through the presence of some other intervening variables lying between the source of communication and the receiver.
- The presence of congenial, physical, psychological and environmental conditions and facilities available for effective communication may facilitate and help in providing the desirable effectiveness to the communication system.
- Poor listening skills are one of the chief problems when communicating. If people are attentive in listening to the message, a lot of misunderstanding can be reduced.
- A lot of noise also affects communication. Noise is usually, but not always, in the form of sounds.
- Different perceptions of different people have their own limitations. According to Francis Bacon, 'man prefers to believe what he prefers to be true'.
- There is a limit to the functioning of human memory. Everything that is said cannot be always retained. The retention is even lower if the receiver is not interested or attentive. This causes a breakdown in the process of communication.
- Excess of information also acts as communication barrier. A lot of information faces many drawbacks and different respondents react differently to filter the information and receive only what they need. Hence for effective communication, the amount of information can be reduced.

- Effective communication is the essential requirement for having an effective interaction or getting maximum advantages from the process.

## 2.6 Key Words

- **Psychological noise**: It refers to mental trouble and turmoil, inattentiveness and indifference.
- **Noise:** Noise, in a physical form denotes the loud noise made by machines, speaker or other such things.
- **Poor vocabulary:** Low level of vocabulary is an obstacle to the communicator in conveying the message in its exact form.

## 2.7 Terminal Questions

1. What are the major types of barriers to communication?
2. How does 'poor vocabulary' act as a barrier?
3. What do you understand by psychological noise?
4. 'Excess of information also acts as communication barrier'. Explain.
5. List some of the different ways that can help overcome barriers in communication.

## 2.8 Suggested Reading

Ellington, Henry, Fred Percival and Philip Race. *Handbook of Educational Technology*. London, UK: Kogan Page.

K. Barlo, David. *The Process of Communication: An Introduction to Theory and Practice.* California, US: Holt, Rinehart and Winston.

Joyce Bruce R., Marsha Weil. *Models of Teaching*. New York, US: Pearson.

Das, B.C. *Educational Technology*. New Delhi : Kalyani Publishers.

Das, R.C. *Educational Technology*, New Delhi : Sterling Publishers.

Sharma, R.A. *Technology of Teaching*: Meerut: International publishing House.

## 2.9 Model Answers to 'Check Your Progress'

**Check Your Progress-1**

1. It is possible for one word to have many different meanings. It is not necessary for the meaning that is ascribed to a word by the communicator to be the same as that ascribed by the receiver to the

same word. One word can have different meaning for different people at different points of time. Hence, it is possible that the sender and the receiver, most of the time, ascribe different meanings to the same word. This type of communication barrier is called semantic barrier.

2. Emotions refer to the way we feel about the world around us. Constructive emotions like happiness, adoration or liking make the flow of communication smooth. However, negative emotions like fear, distrust, anger, anxiety and hatred, work as powerful hindrances to efficient means of communicating.

**Check Your Progress-2**

1. Dr Kumar (1996) has tabulated four chief barriers in communication. They are:

| Types of Barriers | Barriers |
|---|---|
| Physical barriers | Noise, invisibility, environment and physical inconveniences, poor health, lack of attention |
| Linguistic barriers | Verbose, unclear words, unnecessary words, grinding words, wrong pronunciation, unclear graphics and symbols |
| Psychological barriers | Prejudice, disinterest, wrong perception, unrewarding experience, more than necessary anxieties, incomplete curiosities |
| Background barriers | Previous learning, cultural discrimination, previous work situation and environment |

2. Some of the important ways that can help improve listening habit are as follows:
   (a) While listening, do not pay attention to other visuals or noise etc.
   (b) Whatever you are listening, listen it completely and attentively.
   (c) When you are asked something, listen properly and then answer. It is not good to guess.
   (d) Attention should be paid to the speaker's facial expressions, voice, rate of speaking etc.
   (e) Keep in mind, a good listener is able to transmit well.

# BLOCK – II: STAGES, LEVELS AND METHODS OF TEACHING

## UNIT – I: DIFFERENTIATE BETWEEN TEACHING, INSTRUCTION, CONDITIONING AND TRAINING, MEMORY, UNDERSTANDING AND REFLECTIVE TEACHING

**STRUCTURE**


**1.0 Objectives**

**1.1 Introduction**

**1.2 Concept of Teaching and its related aspects**

**1.2.1 Meaning and Characteristics**

**1.2.2 Structure of Teaching**

**1.2.3 Principles of Teaching**

**1.3 Levels of Teaching**

**1.3.1 Memory, Understanding and Reflective teaching**

**Check Your Progress – I**

**1.4 Distinguish Teaching from Instruction, Conditioning and Training**

**Check Your Progress – II**

**1.5 Let us sum up**

- **Key Words**
- **Suggested Readings**
- **Answers to check your progress**
- **References**
- **Model Questions**

## 1.0 Objectives

After going through this unit, you will be able to –

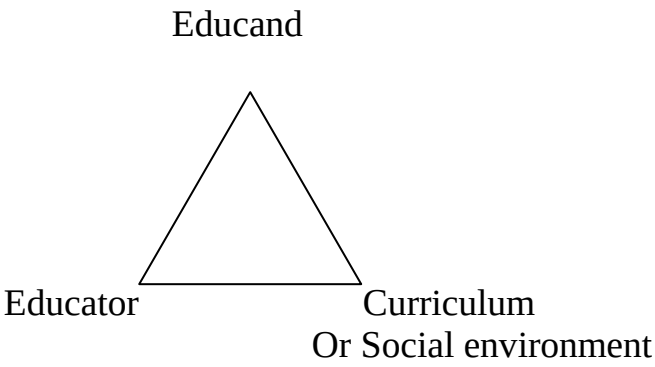
- Define the concept of Teaching.
- Know the structure and principles of teaching
- Acquire the level of Teaching.
- Distinguish teaching from Instruction, Conditioning and Training

## 1.1 Introduction

In this Unit, you will learn about the concept of teaching and its related aspects, levels of teaching and difference between teaching and instruction, teaching and conditioning, teaching and training.

Education is a continuous process of human being. It starts from birth till death. In general sense, it means knowledge; facts or information. It is the process of developing human resources. In narrow sense, education means schooling. The knowledge which can be acquired inside the educational institution is education. In narrow sense, education is only the formal education. But in broad sense, education is a lifelong process. The knowledge and experience which we can acquire from birth to till death, it is considered as education. Education in its broad sense includes all formal, non-formal, informal type of education.

John Dewey, the great American educationist said that education is a triangular process. The three poles are namely – Educator, Educand and Curriculum or Social Environment.




One of the important polar of education is the Teacher or Educator. Teacher plays the significant role in teaching learning process. One of the important functions of teacher is teaching. It is through teaching that the teacher can impart his/ her knowledge, information to the part of the learner. It is the interaction between the teachers and taught. The primary goal of teacher is to modify the behaviour of the learner.

## 1.2 Concept of Teaching and its related aspects

This section of the unit will help you to learn the meaning, characteristics and types of Teaching. You also learn the Memory, Understanding and Reflective teaching

### 1.2.1 Teaching – Meaning and Characteristics

Teaching is a social process. It is a two way process of connection between teacher and taught. It means the act, practice, occupation or profession of a teacher. With the help of teaching, teacher can modify the learner's behaviour. In narrow sense, teaching means only the knowledge, skill, information imparted by the teacher to the learner inside the classroom but in broader sense in teaching process, every person or an object goes on teaching one or the other thing to the pupil right from birth till death.

The definition of teaching as given by different educationists can be discussed are as follows:

1. **BURTON** – "Teaching is the stimulation, guidance, direction and encouragement of learning."
2. **B.O. SMITH** – "Teaching is a system of actions intended to induce learning."
3. **N.L. GAGE (1961)** – "Teaching is a form of interpersonal influence aimed at changing the behaviour potential of another person."
4. **THOMAS F. GREEN (1971)** – "Teaching is the task of teacher which is performed for the development of a child."
5. **H.C. MORRISON (1943)** – "Teaching is an intimate contact between a more mature personality and a less mature one which is designed to further education of later."

**Characteristics of Teaching:**

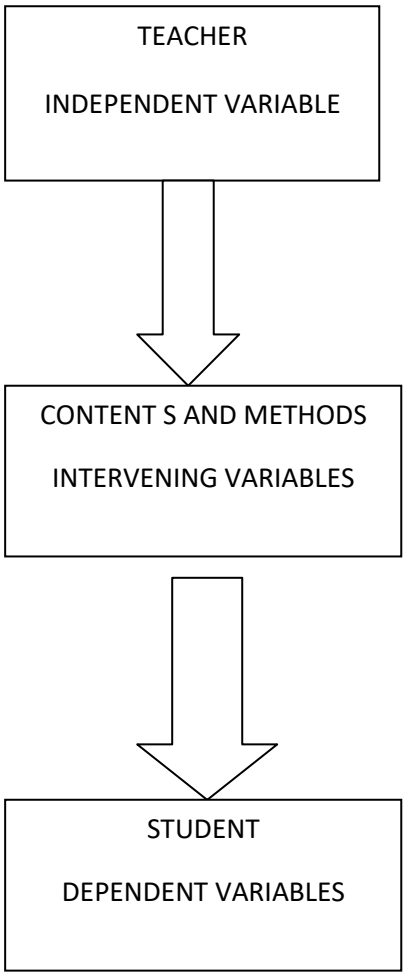
The following are the important characteristics of Teaching:

1. Teaching is a social professional activity.
2. It is a two way process of interaction between teacher and taught.
3. Teaching is measurable and quantifiable through observable technique.
4. Teaching can be modified by the use of feedback process.
5. Teaching is verbal.
6. Teaching is a face to face technique between teachers and taught.
7. Teaching involves different function like telling, showing and doing.
8. Teaching is a prescription to the learner.
9. Teaching is a continuous process from training to indoctrination through training and instruction.
10. Teaching involves the process of encouraging, harmonizing, expressing and balancing functions.

## 1.2.2 Structure of Teaching

In the structure of teaching, there are mainly three variables included i.e. Independent variables, Intervening variables and Dependent variables.

**STRUCTURE OF TEACHING**




In teaching learning process, teacher is independent variable. He should play the role as a planner, organiser, leader and controller. Secondly, the teaching content, teaching technique, teaching methods, instructional aides etc. are intervening variables. Thirdly, students are dependent variables in teaching learning process.

### 1.2.3 Principles of Teaching

The principles of teaching can be divided into two types:

1. General Principles of teaching
2. Psychological Principles of teaching

- **General Principles of teaching**

  General principles of teaching can be categorised as under:

  1. **Principle of definite aims**: Teaching should have definite aim. Without definite aim no teaching is possible to achieve its goal.
  2. **Principle of Model presenting**: Model of teaching can be defined as an instruction design which describes the process of specifying and producing particulars environmental situations which cause the students to interest in such a way that a specific change occurs in their behaviour. So every teacher should prepare model of teaching.
  3. **Principle of Activity**: Teaching should be based on method of learning by doing or activity method in which students can take active part in teaching learning process.
  4. **Principle of flexibility:** Teaching should not be rigid and fixed. It should be flexible and elastic. It should be changed according to needs of the society.
  5. **Principle of Child Centeredness:** Modern education is child-centric education. It gives importance on interest, needs, capacity, aptitude and age of the students. Therefore teaching should be based on according to abilities of the students. It should be child centred and not the teacher centred.
  6. **Principle of Individual difference**: Every individual are differ from one to another not only in respect of physical abilities but also

in mental abilities. Therefore teaching should be according to the principle of individual difference.

7. **Principle of co-relation:** One of the important principles of teaching is co-relation. It means that the content of the teaching subjects should be linked with each other.
8. **Principle of Planning**: According to this principle, the teacher should plan the lesson before he will enter in the classroom.

- **Psychological Principles of teaching**

The psychological principles of teaching can be discussed are as follows:

1. **Principle of Motivation and Interest:** Motivation plays a significant role in teaching learning process. This principle implies that both teacher and the learner should work with interest and motivation.
2. **Principle of recreation:** Recreation simply means a process of taking rest. Teaching should follow this principle as the students want to take recreation after a time.
3. **Principle of repetition and exercise:** It is essential for the learner to recall the past experiences.
4. **Principle of remedial teaching:** Remedial teaching is also essential for better understanding of the contents.
5. **Principle of sympathy and cooperation:** Teacher should be sympathetic towards the child. He should help the learner to solve the different problems.
6. **Principle of reinforcement:** Reward and Punishment plays the significant role in learning process. Reinforcement is a process of providing reward to students after getting correct responses. It will increase the child's creative tendency for learning.

## Check Your Progress I

Note: a) Write your answer in the space given below.

b) Compare your answer with the one given in the end of the unit

1) What is the meaning of Teaching?

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2) Write any two important principles of teaching?

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## 1.3Levels of Teaching

There are four levels of teaching learning process:

1. Autonomous Level of Teaching – Learning
2. Memory Level of Teaching – Learning
3. Understanding Level of Teaching – Learning
4. Reflective Level

### 1.3.1 Memory, Understanding and Reflective teaching

- Autonomous Level of Teaching – Learning

This is the first level of teaching learning process. At this level importance was given on that level of teaching which gives importance on the innate talent of the learner. Teaching is to be provided according to individual difference of the learner.

- **Memory Level of Teaching – Learning**

The second level of teaching gives importance on memory power of the learner. It is the thoughtless level of teaching. This is based on S-R bond theory of learning in which bondage is found between the stimuli and response without concerning any purpose or goals. The teacher gives the information to the student but student can memorise it without any understanding. There is no place of insightful learning at this level of teaching. It cannot develop our intellectual ability but most of the teaching at this level is carried on memory level which helps in learning of fundamental skills such as spelling, grammar and principles of arithmetic.

Signal learning, Chain learning and stimulus response learning are emphasized in the memory level of teaching. The memory level teaching is teacher centred. Teacher plays the significant role in teaching learning process and students plays the secondary place. In this level of teaching, child's interest, needs, attitude, abilities etc. are not considered by teacher when teaching. He provides strict discipline in teaching. There is no mutual interaction between teacher and pupil at the memory level teaching. The teaching of this level is restricted to cognitive level aspects.

**Herbert's Model of Memory Level Teaching**

Herbert was the profounder of Memory Level Teaching. He described the following steps of memory level teaching:

1. ***Focus*** : The main focus of memory level of teaching is to development of the following capacities:
   (i) Training of mental aspects
   (ii) Providing knowledge of facts
   (iii) Retaining the learnt facts
   (iv) Recalling and re- presenting the learnt facts.
2. ***Syntax:*** Herbert has divided the memory level teaching in to five steps which are also known as Herbert's Five Formal Steps. These five steps are as follows:
   (i)(a) Preparation
   (b) Statement of Aim
   (ii) Presentation
   (iii) Comparison of Association
   (iv)Generalizations
   (v)Application

(3) ***Social System***: Teaching is a social system as it involves teacher and pupil. At this level, the behaviour of the teacher is dominating based upon the authoritarian tendencies. He controls the behaviour of the pupil in the classroom teaching. He plays active role in the classroom and the functions of pupil are passive listener.

(4) ***Support System***: At this level, while evaluating the teaching, both oral and written examination is used. At this level essay type examination is more useful, but recall and recognition factor of memory are also used successfully through the objective type examination.

- **Understanding Level of Teaching – Learning**

  This is the perception level of teaching. At this level, learner can understand the material that received from different kind of sense

organ. For example, understanding as seeing relationship, understanding the use of a fact etc. The teacher makes the pupils understand the generalizations, principles and facts. He tries to provide more opportunities to develop the intellectual level of pupils. At this level of teaching, both teacher and students participates in developing the content of teaching.

**Morrison's Model of Understanding**

The Model of Understanding-level teaching was introduced by Morrison, so it is known as Morrison's Teaching Model.

1. ***Focus:*** The objective of the understanding level teaching model is that the pupil should achieve the mastery of the content. The teacher also gives importance on the mastery of the content so that a desirable change may occur in the personality of the pupils.
2. ***Syntax:*** Morrison has divided the understanding level teaching in to five steps which are also known as Morrison's Five Formal Steps. These five steps are as follows:
   (i) Exploration – Under this step Morrison had included the following activities –
      (a) Previous knowledge testing by questioning
      (b) Analysing the content from psychological point of view.
      (c) Determining the way of presenting new knowledge.
   (ii) Presentation – At this step, teacher delivers his lectures. he should performs the following activities for the presentation of the content –
      (a) The teacher presents the whole content by dividing into small units. He tries to maintain the sequence of these units.

(b) The teacher should evaluate the teaching process, whether the contents have been understood by the students or not.

(iii) Assimilation – It is the step of achieving closure. In this period, both pupils and the teachers remain active. The pupils perform individual activities and the teacher guides them according to their needs.

(iv) Organization – According to Morrison, during the period of organization, the pupils should recall the content and write the content without the help of others. But in some subjects like mathematics, grammar and arithmetic etc. there is no importance of organization rather than recitation.

(v) Recitation – It is the last step of understanding level teaching. During this period, the pupils present the content verbally before the teacher and his friends.

3. ***Social System*** – The role of teacher in understanding level of teaching is differing from one to another. In presentation, the teacher controls the behaviour of the students like memory level teaching. In assimilation period, both teachers and pupils remain active. The teacher provides different kinds of new knowledge to the students. Therefore, in the understanding level of teaching both extrinsic and intrinsic motivation has been used.
4. ***Support System*** – Support System is changing in understanding level of teaching. The pupils have to pass the examination of presentation in order to perform experiment in assimilation. Similarly, for entering in to organization and recitation, pupils have to pass the examination of presentation. At the end of organisation period, a written test has been conducted. Similarly, recitation is

followed by oral test. Therefore, both oral and written tests occur during the various steps of understanding level teaching.

- **Reflective Level**

Reflective level of teaching is combination of both understanding and memory level teaching. Without memory level of teaching and understanding level of teaching, reflective level of teaching cannot form. This level of teaching means 'problem- centred' teaching. It involves the process of problem solving. It is the higher level of learning. Cognitive psychology, which defines learning as acquiring of new knowledge, new insight or understanding, has made a valuable contribution in the process of problem solving. Reflective teaching occurs only when problems is occurring in the situation. At classroom situation, it requires student's active participation, critical thinking, and creativeness in teaching learning process. M.L. Bigge has rightly written about reflective level of teaching, "Reflective level of teaching tends to develop the classroom atmosphere which is more alive and exciting, more critical and penetrating and more open to fresh and original thinking. Furthermore, the type of enquiry pursued by a reflective class tends to be more rigorous and work producing than pursued at an understanding learning situation."

**Hunt's Model of Reflective Level of Teaching**

The reflective level of teaching was developed by Hunt. Therefore, this level of teaching is also named as Hunt's Model of Reflective Level of Teaching.

**Structure of Reflective Model**

1. ***Focus*** – The reflective level of teaching has the following three characteristics-
   (i) To develop problem-solving competency among students.

(ii) To develop critical and constructive thinking among students.

(iii) To develop independent and original thinking power among the students.

2. ***Syntax*** – The syntax of reflective level of teaching is designed in the following four steps-

(i) The teacher is responsible for creating a problematic situation before the students.

(ii) The pupils formulate more than one hypothesis for the solution of a problem.

(iii) Pupils collect the data through different tools to test the hypotheses

(iv) After testing the hypotheses, results are derived.

(3) ***Social System***: In Reflective level teaching, pupils' plays primary place and the teacher secondary place. The classroom environment is open and independent for all. Pupil can share views according to their choice.

(4) ***Support System***: In Reflective level of teaching, objective type tests are not useful. Therefore essay type test has been conducted for evaluating the pupil's attitude, involvement and creative competencies.

**Check Your Progress II**

3) Write any one important level of teaching( within 50 – 60 words)

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## 1.4Distinguish Teaching from Instruction, Conditioning and Training

### Difference between teaching, Instruction Conditioning and Training

In order to understand the real meaning of teaching, it is essential to understand the difference between (i) teaching (ii) Instruction (iii) Conditioning, and (iv) Training. Hence we are clarifying the differences in these three terms in the following ways:

### Difference between teaching and instruction

Teaching includes instruction but the instruction does not include teaching. Teaching is instruction but the instruction is not teaching. Teaching is a process of interaction between the teacher and the pupil.

All the aspects of cognitive, affective and psychomotor of the pupil can be developed by teaching, while by instruction, only cognitive aspect can be developed. Hence, instruction can help to achieve the objectives of cognitive aspect.

### Difference between teaching and conditioning

Conditioning is of two types i.e. Classical and Operant Conditioning. There is a difference between two conditioning in the sense that in Classical Conditioning, the reinforcer determines the kind of behaviour while in operant conditioning the occurrence of response determines the kind of reinforcement.

Classical Conditioning cannot be compared with Teaching because in this type of conditioning an organism comes to elicit a response naturally. But Operant Conditioning is to be compared with Teaching because it is like a systematic form of training and ultimate is teaching. For example, in classroom teaching, reward is given to the students for their particular response.

**Difference between teaching and training**

Both the term teaching and training are closely related, but these two terms are not the same. The training is a part of teaching. The training is a process of attaining various skills. But teaching involves as a process of acquiring knowledge, skill etc.

Teaching is mostly theoretical based but Training is practical oriented. Teaching provides new knowledge, instruction and information but training help to shape our habits, facilitates learning etc. teaching usually refers to classroom learning. On the other hand, training refers workshops, seminars involving various simulation methods, role plays etc.

Training is an active process where there is a combination of interaction, questioning, learning by doing, role plays, games and practical activities.

Teaching is long term duration. But training is usually a onetime or short term event.

Though it can be said that teaching and training are differs from one to another, but there is remain a significant relationship between teaching and training. For both activities, it requires both cognitive and psychomotor domains of knowledge.

4) Write the difference between teaching and instruction?

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5) How Teaching is differing from training? ( within 50 -60 words)

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## 1.6 Let us sum up

In this unit, we have described the concept, meaning, structure and principles of teaching and also the level of teaching; distinguish teaching from instruction, training and conditioning. Here are the main points:

1. Teaching is a two way process of connection between teacher and taught
2. Education is a triangular process. The three poles are namely – Educator, Educand and Curriculum or Social Environment.
3. In teaching learning process, teacher is independent variable Secondly, the teaching content, teaching technique, teaching methods; instructional aides etc. are intervening variables. Thirdly, students are dependent variables in teaching learning process.
4. The principles of teaching can be divided into two types:
   General Principles of teaching and Psychological Principles of teaching
5. There are four levels of teaching learning process:
   Autonomous Level of Teaching – Learning, Memory Level of Teaching – Learning, Understanding Level of Teaching – Learning Reflective Level

- **Key Words**

**Teaching:** Teaching is the stimulation, guidance, direction and encouragement of learning.

**Structure:** A building or other object constructed from several parts

**Principles**: A general scientific theorem or law that has numerous special applications across a wide field.

**Level:** A position on a scale of amount, quantity, extent or quality

## Suggested Readings

1. Borah, Surajit. ( 2014), Techniques and Methodology of Teaching,Kiran Prakashan, Dhemaji
2. Borkakati, Bidyananda. (2005), Methods & Techniques of Teaching, students Amporium, Dibrugarh.

- **Answers to check your progress**

**Check Your Progress I**

1) Teaching is a social process. It is a two way process of connection between teacher and taught. It means the act, practice, occupation or profession of a teacher. With the help of teaching, teacher can modify the learner's behaviour.
2) **(a) Principle of Model presenting**: Model of teaching can be defined as an instruction design which describes the process of specifying and producing particulars environmental situations which cause the students to interest in such a way that a specific change occurs in their behaviour. So every teacher should prepare model of teaching.

**(b)Principle of Activity**: Teaching should be based on method of learning by doing or activity method in which students can take active part in teaching learning process.

## Check Your Progress II

3) Reflective level of teaching is combination of both understanding and memory level teaching. Without memory level of teaching and understanding level of teaching, reflective level of teaching cannot form. This level of teaching means 'problem- centred' teaching. It involves the process of problem solving. It is the higher level of learning. Cognitive psychology, which defines learning as acquiring of new knowledge, new insight or understanding, has made a valuable contribution in the process of problem solving. Reflective teaching occurs only when problems is occurring in the situation. At classroom situation, it requires student's active participation, critical thinking, and creativeness in teaching learning process. M.L. Bigge has rightly written about reflective level of teaching, "Reflective level of teaching tends to develop the classroom atmosphere which is more alive and exciting, more critical and penetrating and more open to fresh and original thinking. Furthermore, the type of enquiry pursued by a reflective class tends to be more rigorous and work producing than pursued at an understanding learning situation."

## Check Your Progress III

**4)** Teaching includes instruction but the instruction does not include teaching. Teaching is instruction but the instruction is not teaching. Teaching is a process of interaction between the teacher and the pupil.

All the aspects of cognitive, affective and psychomotor of the pupil can be developed by teaching, while by instruction, only cognitive aspect can be developed. Hence, instruction can help to achieve the objectives of cognitive aspect.

5) Both the term teaching and training are closely related, but these two terms are not the same. The training is a part of teaching. The training is a process of attaining various skills. But teaching involves as a process of acquiring knowledge, skill etc.

Teaching is mostly theoretical based but Training is practical oriented. Teaching provides new knowledge, instruction and information but training help to shape our habits, facilitates learning etc. teaching usually refers to classroom learning. On the other hand, training refers workshops, seminars involving various simulation methods, role plays etc.

Training is an active process where there is a combination of interaction, questioning, learning by doing, role plays, games and practical activities.

Teaching is long term duration. But training is usually a onetime or short term event.

- **References**

1. Borah, Surajit. ( 2014), Techniques and Methodology of Teaching,Kiran Prakashan, Dhemaji
2. Borkakati, Bidyananda. (2005), Methods & Techniques of Teaching, students Amporium, Dibrugarh.
3. Sharma, B.L. & Saxena, R.N. (2003), UGC NET/SLET EDUCATION, R.Lall Book Depot, Meerut

- **Model Questions**

1. Explain the meaning and characteristics of Teaching?
2. Discuss the different kinds of principles of teaching?
3. Discuss any one level of Teaching?
4. How Teaching is differing from Training and Conditioning?

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# UNIT-II

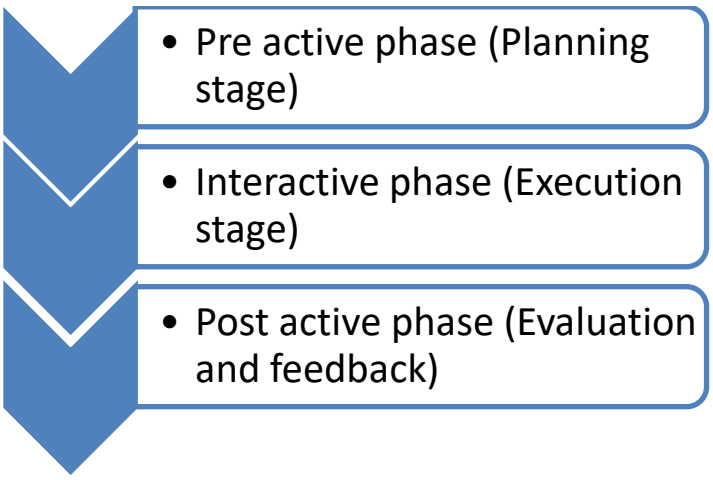
# Pre active, Interactive and Post active Teaching

## 1.0 Objectives

a) To understand the steps of teaching.
b) To help in effective teaching.
c) To know the proper planning of teaching.
d) To carry out execution of effective teaching.
e) To gain knowledge, understanding and skills of evaluation and feedback.
f) To enable to use proper reinforcement techniques.

## 1.1 Introduction

From the previous unit, we get a clear picture of teaching and instruction as well as the levels of teaching (memory, understanding and reflective). In this present unit we will come to know about different phases of teaching which are an integral part of education and teaching. We all know that teaching is an integral part and prime responsibility of a teacher. Teacher has to impart knowledge, develop understanding and skills, inculcate right values and motivate learners toward their goals to accomplish the teaching objectives. Thus, teaching is a complex and most challenging task for which proper planning of the teacher is very necessary. Along with planning, the teacher needs to execute the plans and adapt some techniques for getting feedback from the students and evaluation of the students. Thus, in order to teach properly and effectively, the teacher should go through some primary steps which are called as phases of teaching. The phases of teaching are crucial to get desirable learning outcomes. Keeping in view the need and importance of different phases of teaching, **Philip W. Jackson** divides the act of teaching in to three phases of teaching:




Phases of teaching

## 1.2 Pre active phase of teaching:

Pre active phase is the most important and preliminary phase or stage of teaching. This is the planning stage of a teacher. As we all know that planning is most important for smooth running of any activity. Thus, the teacher needs to prepare plans before going to the classroom. The teacher has to manage the classroom including the furniture, proper sitting arrangements of students, maintaining coherent environment, keeping view on individual difference of each student as well as nature of learning experiences that needs to be provided to students etc which requires pre-determined preparation. The teacher at this stage hypothesizes about the possible outcome of his/her actions. The teacher decides to use what type of relevant textbooks s/he will use, what type of references s/he will suggest, how to bring and keep students' motivation, how to inculcate real values, how to present information etc. The following operations or sub-stages are involved at the pre active phase of teaching:

(1) Formulation or fixing up the goals.
(2) Decision about the content.
(3) Managing or sequencing appropriate means and ways of presentation.
(4) Deciding about appropriate strategies and tactics of teaching.
(5) Developing teaching strategies for the specific subject matter.

Let us discuss these sub-stages.

### 1.2.1 Formulation of goals

The teacher formulates in detail the instructional or teaching objectives in behavioural terms by using Bloom's taxonomy of educational objectives according to which the teacher organizes educational objectives according to cognitive (knowledge, understanding etc.), affective (emotion, feelings etc) and psychomotor (health, body, physique etc.) domain. These objectives are of two types: Entering behaviour of learners and terminal behaviour of learners. These goals are based on psychology of the students as well as need and demand of the society.

### 1.2.2 Decision making about the subject matter

The teacher decides about the content to be taught to the students and organizes the content according to the memory level, understanding level and

reflective level of teaching. This decision about the subject matter is taken on the basis of some points like: demand of the curriculum, entering behaviour and needs of the students, level of motivation of the learners and teacher's preference for assessment etc.

### 1.2.3 Arrangement of the sub-contents or ideas and styles of teaching

The teacher has to arrange sub-contents in a logical sequence, in such a way that it should function empirically. It means sub-contents should be arranged in such a way so that it can facilitate the transfer of learning. Sub-contents should be presented in such a way so that the students can get a clear picture of interlinking of the whole topic or content.

### 1.2.4 Decision making about the strategies of teaching

Keeping in view nature and structure of the content and objectives of teaching, the teacher has to select appropriate strategies and tactics of teaching. This is very important in teacher education programme too. Teaching strategies may vary in different subjects. Such strategies should be adapted by the teachers which can motivate the learners and help them to mastery over the subject matter.

### 1.2.5 Development of teaching strategies

The teacher has to decide before hand or in advance about the strategies which s/he has to use in classroom teaching. S/He has to take decision regarding the use of questioning, group discussion, seminar, use of projector, charts, model etc at the pre active stage.

## Check Your Progress-I

1. What do you mean by teaching?
2. Who provided three phases of teaching?
3. What are the steps of teaching?
4. Mention three domains in Bloom's taxonomy.
5. What do you understand by entering behaviour of the students?

### 1.3 Interactive phase of teaching

The interactive stage of teaching includes all those behaviour and activities which a teacher uses after entering the classroom. The interactive stage involves all activities in presenting the subject matter including managing the physical as well as psychological environment of the classroom. The teacher presents learning experiences in such a way which can bring desirable behavioural changes in the learners.

P.W.Jackson(1966) asserts "The teacher provides pupils verbal stimulation of various kinds, makes explanations and question, listens to students' responses and provides guidance."

The interactive stage includes the following activities of the teacher:

1. Sizing up the class.
2. Diagnosis of the learners.
3. Action or reaction
   a) Selection of stimuli.
   b) Presentation of stimuli.
   c) Selection of reinforcement
   d) Development of strategies.

Let us discuss these activities.

### 1.3.1 Sizing up the class

After entering the classroom, the teacher perceives the size of the class, the encouraging or helpful as well as the discouraging things for him/her in the classroom and the faces of students. Similarly, the students too perceive the personality of the teacher. Thus, the personality of the teacher should reflect the qualities of a teacher.

### 1.3.2 Diagnosis of the learner

A proper diagnosis of the abilities and behaviour of the students is very necessary for appropriate interaction in the classroom. A teacher tries to diagnose and assess the abilities, attitude and interest as well as academic background of the students to have proper interaction in the classroom. The teacher may diagnose the students in different ways. He may ask some questions, assess their performances and behaviour by providing opportunity for performing or behaving. The students also, through verbal or non-verbal interaction get opportunity to assess and diagnose the abilities, interest, aptitude and behaviour performance of their own responses and reactions for contributing towards effective interaction in the teaching learning situation.

### 1.3.3 Action or reaction

Action-reaction processes play the central role in the task of classroom interaction. For this purpose, teacher has to take right decision with regard to the selection and presentation of the proper stimuli, schedule of reinforcement and feedback devices, and development of suitable strategies suiting to the needs of the pupil, teaching environment and teaching objectives.

**a) Selection of stimuli**

The teacher himself or herself acts as stimuli. The stimuli in the action or activity of teaching can be verbal as well as non-verbal, the way the teacher stands and moves around in the class etc. A good teacher must know which one is appropriate stimuli or which is irrelevant stimuli in that particular teaching situation. Teacher should be able to select desirable or functional stimuli in view of the present situation before

him which can motivate the students as well as can create a suitable environment to meet the needs of students.

**b) Presentation of the stimuli**

The teacher must know three things in presenting the stimuli in the classroom:

(i) Form: The stimuli should be presented in proper form which can motivate the students.

(ii) Context: The stimuli should be presented with reference to the relevant context of the learning experiences to be provided to the students in the classroom.

(iii) Order or sequence: While presenting the stimuli, proper order or sequence should be maintained. Otherwise, it may demotivate the students.

**c) Selection of Reinforcement and feedback**

It is a condition which will increase the probability that a particular response will be repeated in future because the teacher, after observing the behaviour or response of the learner provides certain reinforcement in verbal and non-verbal form. It may be of two types:

(i) Positive reinforcers: Which may increase the probability of reoccurring the desirable response or behaviour, e.g., praise, appreciation, reward, knowledge of result etc.

(ii) Negative reinforcers: Which may decrease the probability of reoccurring the undesirable response or behaviour, e.g., reproof, punishment etc.

The reinforcement is applied for three purposes:

(i) For strengthening the response or behaviour (positive) of the learner.

(ii) For changing response or behaviour (positive or negative) of the learner.

(iii) For modifying response or behaviour (negative) of the learner.

**d) Development of strategies**

The strategies of reinforcing the students, of controlling their verbal and non-verbal behaviour are used for imparting the subject matter effectively while a teacher teaches in the classroom. The teacher adapts the strategies by keeping in view the nature of learning experiences as well as the nature of the students and the classroom environment.

Thus, the interactive stage involves three areas:

i. Presentation of subject matter
ii. Types of learning experiences
iii. Context of the learners(background, motivation, needs, attitudes etc.)
iv. Providing reinforcement to students.

The interactive stage generates the climate in the classroom which influences teaching learning process in the classroom.

**Check Your Progress-II**

1. What is interactive phase of teaching?
2. Mention two activities of a teacher in this stage.
3. Mention one impact of reinforcement.
4. How the stimuli should be presented in the classroom?

## 1.4 Post-Active phase of Teaching:

It is an evaluative phase of teaching. It includes the teacher task which evaluates student's performance based on classroom teaching. The behavioural change of students are assessed at the end of teaching. The oral or written questions are asked at the third stage of teaching. The followings are the main operations at the stage of teaching:

**1.4.1 Emphasizing the exact Dimensions of Behavioural Change**: The teacher emphasizes on evaluation of the expected behavioral

change and their actual behavioural change during teaching. Most of the students emit the expected behaviour.

**1.4.2 Selecting Appropriate Testing Devices**: The teacher chooses certain suitable testing techniques and tools to measure the various desired dimensions of behaviour. The test should be reliable, valid and objective in nature. Cognitive and non-cognitive outcomes require different types of testing devices.

**1.4.3 Changing or Improving Strategies of Teaching**: The student's evaluation is needed to see the effectiveness of instructions and teaching strategies of the teacher. It may provide a basic for improving his teaching by reorienting his teaching and changing strategies of teaching.

**Check Your Progress-III**

1. What do you understand by post active phase of teaching?
2. Mention one operation of post active phase of teaching.

## 1.5 Difference between Pre active and Interactive Phases of teaching

The pre active and interactive phases of teaching are quite similar and create confusion. Although an attempt has been made to differentiate between these two phases of teaching:

i. Pre active teaching phase is concerned with planning aspect of teaching, whereas interactive phase of teaching is related with presentation aspect.
ii. Pre active behaviour is more or less deliberate whereas interactive behaviour is spontaneous. The teaching is highly rational process.
iii. The interactive teaching behaviour is rapid in the classroom situation whereas the pre active teaching is rather slow.

## 1.6 Suggested Readings

1. Aggarwal, J.C.,(2015). Essentials of Educational Technology. Vikas Publishing House Private Limited, Delhi.

2. Bhatt, B.D. and Sharma, S.R.,(1992). Educational Technology. Kanishka Publishing House, Delhi.

3. Mangal, S.K.,(2001). Foundations of Educational Technology. Tandon Publications, Ludhiana.

4. Sharma, R.A.(2013). Educational Technology. R.Lall Book Depot, Meerut.

5. Skinner, B.F.(1968). Technology of Teaching. Appleton Century Crofts, New York.

## Possible answers to CYP

**CYP-I**

**1.** Teaching is that complex task through which the teacher has to impart knowledge, develop understanding and skills, inculcate right values and motivate learners toward their goals to accomplish the teaching objectives.

**2.** Philip W. Jackson

3. Pre active, interactive and post active phases of teaching.

**CYP-II**

1. Interactive phase of teaching is execution part of pre active phase. It involves all activities in presenting the subject matter.
2. Sizing up the class and diagnosis of the learners.
3. Reinforcement can motivate the students to evoke desirable response or behaviour.
4. The stimuli should be presented in proper form, order or sequence as well as with reference to the context of learning experiences.

**CYP-III**

**1.** Post active phase of teaching is an evaluative phase of teaching. It includes the teacher task which evaluates student's performance based on classroom teaching.

2. Selecting Appropriate Testing Devices.

## References

Aggarwal, J.C.,(2015). Essentials of Educational Technology. Vikas Publishing House Private Limited, Delhi.

Bhatt, B.D. and Sharma, S.R.,(1992). Educational Technology. Kanishka Publishing House, Delhi.

Bloom, B.S., (1954). Taxonomy of Education, objective of cognitive domain. David McKay Company Inc, New York.

Dass, R.C., (1993). Educational Technology-A basic text. Sterling Publishers, New Delhi.

Mangal, S.K.,(2001). Foundations of Educational Technology. Tandon Publications, Ludhiana.

Sampath, K.,(1981). Introduction to Educational Technology. Sterling Publishers, New Delhi.

Sharma, R.A.(2013). Educational Technology. R.Lall Book Depot, Meerut.

Skinner, B.F.(1968). Technology of Teaching. Appleton Century Crofts, New York.

### Model Questions

1. What are the different phases of teaching?
2. Why is the post active stage important?
3. What do you understand by the term ‘phases of teaching’? Describe the various phases and their operations.
4. Describe the pre active phase of teaching.
5. Briefly explain the post active phase of teaching.
6. Why interactive phase of teaching is important? Discuss.

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**Educational Technology**

**Block III Unit-III**

**Structure**

3.0 Objectives

3.1 Introduction

3.2 Meaning of Concept

Check Your Progress (1)

3.3 Concept Attainment Model

3.3.1 Fundamental elements of Concept Attainment Model

3.3.2 Phases of Concept Attainment Model

3.3.3 Merits and Demerits of Concept Attainment Model

3.3.4 Application of Concept Attainment Model

Check Your Progress (2)

3.4 Concept of Model of Teaching

3.4.1 Characteristics of Model of Teaching

3.4.2 Elements of Model of Teaching

Check Your Progress (3)

3.4.3 Families of Model of Teaching

Check Your Progress (4)

3.5 Let Us Sum Up

3.6 Key Words

3.7 Possible answers to 'Check Your Progress' Questions

Model Questions

References

**3.0 Objectives**

After completing this unit, you will be able to

a) State the meaning of concept
b) Explain Concept attainment model
c) Describe the concept of model of teaching
d) Identify the characteristics of model of teaching
e) Summarize the features, functions and elements of model of teaching
f) Interpret families of model of teaching

## 3.1 Introduction

In the previous unit, you have learnt about pre active, interactive and post active phase of teaching. Now, you are familiar with all those activities which a teacher performs before entering the classroom, learning experiences that are provided to students through suitable modes during class time and the activities used by teachers to analyze and to evaluate the achievements of the pupils and attainment of the objectives. Teaching is a skillful art. The efficiency of teaching is dependent on modern innovative technology used by teacher before entering the classroom, during the class time and after the class. Educationist has developed various techniques to reach the students. So, the scenario of teaching is changing in modern days.

In the present, you can learn the meaning of concept. Then, you can learn fundamental elements, phases, merits, demerits and application of a familiar model of teaching known as 'Concept Attainment Model'. You will also learn about different model of teaching developed by different educationist. In addition, you will learn the characteristics and elements of model of teaching.

The topics included in the unit are written under different subheadings related to concept, elements, phases, merits, demerits and application of model of teaching. A few questions are put after completion of each topic so that you can check your own progress of learning. You should read attentively each paragraph and try to answer the questions. You can take as much time as you need and if do not understand any sub-point, and then read again and again. The meaning of some notable terms is also stated in the last part of the unit. At the end of the unit, model questions are given. You should try your best to complete those questions also. The topics will help you to understand design of teaching. This unit will be beneficial for teachers of the future.

## 3.2 Meaning of Concept

In simple sense, concept is a mental image of some object or experience. Here, mental image means distinct picture made in the mind about object. So, concept is mental representation of the thing. You may define it as a thought or as an opinion formed by generalization and experience about something. It represents a category of objects which share common properties.

According to Archer (1969), a concept is simply the label of a set of things that have something in common.

Bruner has discussed the five elements of concepts. These are discussed below. Read it.

a) Name: It is the term or label given to a category. For example, mango, banana, grapes, orange, apple etc. are named as fruit.
b) Example: The examples which contain all the essential attributes are known as positive examples. For example, school, temple, club, and youth organization etc. are example of social institution. On the other hand, the absence of one or more essential attributes makes an instance as negative examples. For example, east, west and north are example of side or direction. Here, the example of south is left which make the concept of direction incomplete.
   From the above discussion, it is came to known that positive example expresses what the concept is and negative example reveals what it is not.
c) Attributes: Attributes are the features or characteristics of object. Every concept has two types of attributes:

   Essential attributes: These are the common features or characteristics of the concept. The attributes should be present in all the examples of the concept. For example, map, globe, chart, blackboard, OHP, radio etc. are example of teaching aid. Here, some characteristics of these examples are found that these tools help to make learning interesting and attractive, it make learner active and save the time of the teacher.

   Non-essential attributes: Some of the slight differences among examples of a category reflect the non-essential attributes. For example, Bus, Rail, Aero plane, Ship, Boat etc. is examples of vehicle. But, these vehicles move in different path.

d) Attribute values: It is also one of the elements of concept. The worth of the characteristics of example is known as attribute values. For example, flower is an attribute and lotus, rose, marigold, dahlia, daisy, poppy etc. are attribute values.
e) Rule or definition: Every concept has essential attributes. Rule is the statement that signifies the essential attributes of a concept. For example, triangle is a concept. The rule of this concept can be defined as a triangle is a closed figure with three sides. So, rule is device that reflects positive and negative example of a concept.

**Check Your Progress (1)**

Space is given below for your answer.

Compare your answer with the one given at the end of this unit.

1. What do you mean by concept?

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2. What are the elements of concept?

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3. State the difference between positive and negative example?

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### 3.3 Concept Attainment Model

Concept attainment model was developed by American psychologist Jerome Bruner, Jacquiline Goodnow and George Austine in 1956. So, the model is also known as Bruner's Concept Attainment Model. It comes under the type of Information Processing Model.

Concept Attainment is an indirect instruction strategy that uses a structured inquiry process.

#### 3.3.1 Fundamental elements of Concept Attainment Model

**Focus:** In practice, the model works as an inductive model designed to teach concept through the use of example. It helps to develop thinking process and inductive reasoning.

**Principle of reaction:** It guides the teacher to react to the response of the learner.

**Support system:** This model support teacher to use positive and negative exemplers to the students during teaching.

**Social system:** The teacher record, prompt and present additional data in teaching subject matter.

#### 3.3.2 Phases of Concept Attainment Model

CAM has three phases:

| Phase | Activities |
|---|---|
| Phase I: Presentation of data | • Teacher presents labelled example (both positive and negative)<br>• Students compare the attributes- both positive and negative attributes. Thus, they identify the concept<br>• Students generate and test hypotheses<br>• Students name the concept, state definition according to essential attributes |
| Phase II: testing attainment of the concept | • Students identify additional unlabelled data<br>• Students generate examples<br>• Teacher confirms hypothsis, names, concept, restate definitions |
| Phase III: Analysis of thinking | • Students describe thoughts |

| | |
|---|---|
| strategies | • Discuss the role of hypothesis and attributes<br>• Students discuss type and number of hypotheses |

### 3.3.3 Merits and Demerits of Concept Attainment Model

The merits of Concept Attainment Model are mentioned below:

- This model is beneficial in developing the imagination of the students.
- Students can develop their analytical abilities. It helps students to analyze things systematically.
- It develops the reasoning power of students.
- It is helpful in development of Intellectual ability of students.
- The students learn to observe things minutely.
- Students can take part actively in teaching learning process.
- The use of this model in teaching helps students to develop their self study habit.
- Students are able to give attention in study topic individually.
- Students have no strain regarding learning after application of this model.

The demerits of Concept Attainment Model are as follows:

- It is criticized that the concept attainment model ignores the 'social interaction'. It only helps students for individual learning.
- It ignores the participation of students in classroom.
- Sometimes students can thing wrongly about a concept.

### 3.3.4 Application of Concept Attainment Model

a) The model can be used teaching of language, grammar, science and fundamental of mathematics.
b) This model is also an evaluation tool. The model can be used with students of all grades.
c) CAM guide teachers to improve their instructional system and to attain to the depth of the content.
d) The model has a great relevance to acquire new concept, inductive reasoning and logical reasoning.
   So, the model has a great attribute on teaching-learning process.

**Check Your Progress (2)**

Space is given below for your answer.

Compare your answer with the one given at the end of this unit.

1. What is Concept Attainment Model?

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2. Write the usability of Concept Attainment Model.

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### 3.4 Concept of Model of Teaching

You have heard the term 'Model'. In present days, this term is occasionally used in everyday life. In simple sense, model is representation of a process or system. Now, what is the meaning of representation? It means something that represents another thing. Model is a pattern or blue print or design of something. The term is used in different field. From the view point of education, model is used in teaching field which is known as teaching model. Let us know the concept of teaching model.

Teaching model is a kind of detailed plan of teaching a lesson that could lead to effective learning. It may be called as instructional design prepared for teachers for effective teaching-learning process. In the following some definitions forwarded by educationist on teaching model are stated. Read these carefully to understand the meaning of teaching model more clearly.

1. According to Bruce Joyce and Marsha Weil (1972), "teaching model is a pattern or plan which can be used to shape a curriculum or course, to select instructional materials and to guide teacher's action", all leading to attain certain specific goals. This definition refers that teaching model is a plan prepared by teachers before the class. It helps the teacher to shape a course and to select the teaching material required for teaching in the class. It provides guidance to teacher regarding activities to be done by him during teaching.
2. Let us read another definition on teaching model forwarded by Chauhan (1979). He defines it as "an instructional design which describes the process specifying and producing particular environmental situation which causes the student to interact in such a way that a specific change occurs in their behavior". This definition means that teaching model shape proper classroom environment for the students.

#### 3.4.1 Characteristics of Model of Teaching

The nature of teaching model is mentioned below. Read these.

- Detailed plan: Teaching model is regarded as detailed plan. It includes construction of curriculum or course, selection of instructional materials, guidance to educational activities to teacher, creation of particular environmental situation and change in the behavior of students.

- ❖ Goal-oriented: Teaching model intends to achieve certain kinds of goals. It is designed to attain the specified goal of curriculum.
- ❖ Effective teaching: The model is used to facilitate the teacher so that they can teach concepts to students. It helps to design educational activities and environments.
- ❖ Scientific procedure: Model relates teaching and learning process systematically.
- ❖ Research work: Model emerged out of the study of thinking process of human beings.

### 3.4.2 Elements of Model of Teaching

A teaching model has six fundamental elements.

- ➢ **Focus:** Focus is the central aspect of teaching model.
- ➢ **Syntax:** Syntax describes the phase of the model. It describes the term of sequences of activities called phases. The phases are (a) Presentation of data- teacher introduces about activity. (b) Analysis of hypothesis- formation of hypothesis- teacher's reaction- rejection and confirmation of hypothesis- more examples (c) closure- unorganized data (d) practice.
- ➢ **Principle of reaction:** This element is related to reaction of teacher and students. It informs the teacher how to regard the learner and how to respond to the reaction of students. Teachers also react for wrong answer, aware students, encourage students.
- ➢ **Support system:** It refers to additional requirements beyond the usual human skills, capacities and technical facilities necessary to implement a model. e. g. some support is used in the classroom by teachers as blackboard, flash cards, flannel board etc.
- ➢ **Social system:** It describes interaction between student and teacher. It signifies the social role, norms, social control and reasonable freedom.
- ➢ **Application:** Model helps the learner to apply the learnt things in different situations. Students can apply their knowledge in various discipline, language, math etc. Model can be applied in different curricula and classes.

**Check Your Progress (3)**

Space is given below for your answer.
Compare your answer with the one given at the end of this unit.
1. Why model of teaching is known as detailed plan of teaching?
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2. What are the necessities of model of teaching for teacher?
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### 3.4.3 Families of Model of Teaching

Joycee and Weil (1986) grouped the entire teaching model into four broad categories. These are:

**Information Processing Model:** The model of teaching of this family are concerned with generation of intellectual abilities. These models help individual in the formation of concept, solution of problem, analyze information, development of social relationship and integrated personality.

**Social Interaction Model:** The models come under this family are concerned with the social relationship of the individual with others in the society. Interpersonal relationship is the main thrust of this family. These models aim at the development of social relationship, democratic processes, development of social skill and work productivity in the society. They are also concerned with the development of mind and the learning of academic subjects.

**Personal Development Model:** The models of this family are concerned with development of the unique personality of the learner e.g. an integrated, confident and competent personality. These models bring individual consciousness, self awareness and sensitiveness. These models play more attention to the emotional life of the person. Students understand themselves and recognize their emotions. It also focuses on helping learner to develop the productive relationship with their environment. Students can develop their individual creativity and selfhood.

**Behaviour Modification Model:** The models come under this family are concerned with modification of the observable or overt behaviour of the learner. The application of these models in teaching can help the learner to actively respond to the problem. Students get reinforcement and feedback from the teachers which shape their behaviour. The main psychological bases of these models are stimulus control and reinforcement as put forward in B.F.Skinner's theory of Operant Conditioning and Bundura's theory of those models are that break down the learning task into series of small sequences of behaviour.

Model of teaching helps to bring desirable changes on behavior of students. The teachers get the chance to choose appropriate strategy, technique and material for teaching.

**Check Your Progress (4)**

Space is given below for your answer.

Compare your answer with the one given at the end of this unit.

1. How social interaction model help a teacher in teaching?

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2. Write the functions of Behaviour Modification Model.

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## 3.5 Let Us Sum Up

We have discussed the meaning of concept and its role in acquisition of knowledge. We have also discussed the model of teaching known as Concept Attainment Model and its elements, phases, merits, limitations and application in educational field.

Further, we have discussed the four families of models emphasis upon their approach to education. Social Interaction Model emphasis upon social relationship of individual and participation in democratic process. Personal Model gives importance on development of self-hood. Behaviour Modification Model lays emphasis on acquisition of new behaviour or reshaping behaviour through reinforcement. Information Processing Model insists the development of general intellectual abilities and skills among individual. Concept Acquisition model is one of the important model of Information processing model. Concept Attainment Model is the search for and identification of attributes that can be used to distinguish examplers of a given group or category from non-exemplers.

Model of teaching is instructional design to achieve specific goals as formulation of curriculum, selection of instructional material and activities of teacher. It covers teaching aspects boarder than teaching method and teaching skill. Model brings teaching competency and positive effect on the teaching behaviour. Therefore, teacher should use teaching model in classroom teaching according to grade and subject.

## 3.6 Key Words

**Attribute:** Characteristic, feature, aspect, element etc.

**Exempler:** A model to be copied, an exemplar (origin example)

**Model:** Pattern, design, plan

**Reaction:** Response, feedback

## 3.7 Possible Answers to 'Check Your Progress' Questions

### Check Your Progress (1)

1. Concept is a mental image or mental representation of some object or experience.
2. The elements of concept are name, example, attribute, attribute values, and rule.
3. Positive example expresses what the concept is and negative example reveals what it is not.

### Check Your Progress (2)

**1.** Concept attainment model come under Information Processing Model family. It was developed by American psychologist Jerome Bruner, Jacquiline Goodnow and George Austine in 1956. Concept Attainment is an indirect instruction strategy that uses a structured inquiry process.

**2.** The usability of concept attainment model is stated below:

a) This model has great relevance in developing the imagination power, analytical ability, inductive reasoning, logical reasoning, and intellectual ability of students.
b) Students can take part actively in teaching learning process and can learn individually.
c) The model can be used teaching of language, grammar, science and fundamental of mathematics.
d) This model is also an evaluation tool. It reveals depth of learning. The model can be used with students of all grades.
e) It guides teachers to improve their instructional system and to attain to the depth of the content.

**Check Your Progress (3)**

**1.** Teaching model is regarded as detailed plan because it covers all aspects of teaching. It includes construction of curriculum or course, selection of instructional materials, guidance to educational activities to teacher, creation of particular environmental situation and change in the behavior of students.
**2.** Teaching model is necessary for teachers. Model help teacher to respond to the reaction of students. It refers to additional requirements beyond the usual human skills, capacities and technical facilities necessary to implement a model. Model of teaching assist teachers and students to interact in proper environment. It also helps the learner to apply the learnt things in different situations.

**Check Your Progress (4)**

**1.** Social Interaction Model has relevance for teachers in teaching. It teaches teacher to develop the attitude of making social relation with others among students. The students learn how to make interpersonal relationship in the society. They can develop democratic outlook, social skill and work productivity in the society.

**2.** The functions of Behaviour Modification Model:

a) Behaviour Modification Model emphasizes on modification of the observable behaviour of students.
b) It can help the learner to actively respond to the problem.

c) Students get reinforcement and feedback from the teachers which shape their behaviour.

**Model Questions**

1. Define model of teaching. Mention the characteristics of model of teaching.
2. Explain the Concept attainment model. Discuss merits and demerits of concept attainment model.
3. Summarize the elements of model of teaching.
4. Interpret briefly the families of model of teaching.

**References**

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**Bk IV**

## Unit-1: PROGRAMMED INSTRUCTION AND TEACHING MACHINE

**Structure**


1.0 Objectives

1.1 Introduction

1.2 Programmed Instruction

- 1.2.1 Brief History of Programmed Instruction
- 1.2.2 Meaning and Definition of Programmed Instruction
- 1.2.3 Characteristics of Programmed Instruction
- 1.2.4 Fundamental Principles of Programmed Instruction

1.3 Types of Programmed Instruction

- 1.3.1 Linear Programming
- 1.3.2 Branching Programming
- 1.3.3 Mathetics Programming

1.4 Teaching Machine

- 1.4.1 History of Teaching Machine
- 1.4.2 Meaning and Characteristics of Teaching Machine
- 1.4.3 Components of Teaching Machine
- 1.4.4 Advantages and Disadvantages of Teaching Machine

1.5 Let Us Sum Up

1.6 Key Words

1.7 Terminal Questions

1.8 Suggested Reading

1.9 Model Answers to 'Check Your Progress'


## 1.0 Objectives

After going through this unit, you will be able to:

- Describe the development of Programmed Instruction
- Define Programmed Instruction
- Discuss characteristics and fundamental principles of Programmed Instruction
- Distinguish between Linear, branching and Mathetics Programmed Instruction
- Elaborate the development of Teaching Machine.
- List and discuss the components of Teaching Machine
- Discuss the characteristics, advantages and limitations of Teaching Machine

## 1.1 Introduction

Learners, in this unit, you will learn about one of the significant developments in the field of Educational Technology, namely Programmed Instruction. We will also discuss about its various types, the significance and characteristics of each type and so on.

Learners, it is also known as programmed learning. It is a highly individualized and systematic instructional strategy and hence it is considered as one of the most useful technology for classroom instruction as well as self-learning or auto-instruction.

It is not only a technique for effective learning, but also a successful feedback device for the modification of teachers' behaviour. It provides insight into the problems of teaching through improved feedback and reinforcement mechanism.

Besides, you will learn about teaching machine. The pressure of the increasing population is affecting schools and teachers in such a way that there is a higher demand of quality education and individual attention. Therefore, noted educationists are giving their best to deal with such situations. One of these solutions is 'teaching machine', which is also referred to as programmed teaching. Teaching machine is a mechanical or electronic device for self-teaching which is automatic in nature and is controlled by the user. It helps in presenting the information to the leaner and is also able to get his response.

## 1.2 Programmed Instruction:

Programmed Instruction is an innovative way of teaching-learning process. In this method the content / subject matter is presented to the students in a sequence of small and controlled steps. Students can study in their own space without physical presence of the teacher or

instructor. Although, computers and other types of teaching machines are usually used to present the programmed instruction material, they can be presented through books also.

Programmed Instruction (PI) or Programmed Learning (PL) is not only a technique for effective teaching-learning, but also a successful feedback device for the instructor/teacher to modify their teaching behaviour. This is an application of various principles of behavioral sciences and technology in the teaching-learning process. This learning experience involves self-evaluation, reinforcement, active participation and so on.

In this technique, the whole content is divided into small parts and then all the parts or all the piece of information are presented to the students in a logical sequence. This piece of information is called ***frame***. After that the students need to answer few objective type questions, and on the basis of that answer the PLM instructs the student to proceed to another frame. Thus, the students need to master over one step before proceeding to the next step. As it is a self-instructional device, students can learn according to their own pace of learning. Learning through Programmed Instruction is more rapid as well as interesting. It is directed towards achievement of specific and pre-determined objectives.

### 1.2.1 Brief History of Programmed Instruction:

Programmed instruction originated from the psychology of learning, not from technology. Application of Conditioning theory to the teaching-learning process is the base of programmed learning. It was emerged as the result of the efforts of American psychologist in the beginning of the $20^{th}$ century. It is said that, the first instance of programme learning was found in the works of E. L Thorndike (1874-1949). Some other psychologists who have made significant contribution in this field are **Sydney L. Pressey, Robert M. Gagne, Robert Mager and B.F. Skinner.**

Programmed learning is related to Thorndike's "Laws of Effects". Prof. Sydney L. Pressey, a psychologist from Ohio State University has developed a machine in the middle of 1920's, which could teach and also test the students.

Another famous psychologist, B.F. Skinner and two of his associates started programming by training a pigeon to roll a small ball by operant conditioning. He published a book namely, ***"The science of learning and art of teaching"*** in 1954 and programme learning got a

momentum only after the publication of this book. Skinner and James G. Holland invented an auto-instructional method which have credited with the basis for today's programmed instruction.

In the year 1955, Norman A. Crowder developed "***automatic tutoring by intrinsic programming".*** Another concept "Learner Controlled Instruction" was developed by Robert Mager. In this method, the learner guided the instructor, the instructor remained silent unless the learner required help from the instructor.

At Illinois University, Chicago, a psychologist named Stoluron developed another individualized and computer-based learning process. Moreover, in 1962, T.F.Gilbert had developed a technology called Mathetics. Finally, in 1965, Lawrence Stolurow invented Computer Assisted Instruction (CAI). Learners you will be learning CAI in the succeeding unit.

### 1.2.2 Meaning and Definition of Programmed Instruction

Programmed instruction is a research-based instructional system which helps students to learn successfully according to their own pace of learning. In this method individualized instructions, immediate feedback etc. are provided to the students. The physical presence of teacher is not essential in this strategy. The base of this method is the research studies conducted by various applied psychologists and educators, especially in the USA.

Learners, here we are providing some established definitions of programmed instruction given by different experts.

B.F. Skinner: 'Programmed learning is the first application of laboratory technique utilized in the study of the learning process to the practical problems of education.'

1. W.I. Smith and J.W. Moore (1962): 'Programmed instruction can be defined as the process of arranging the material to be learned into a series of sequential steps. Usually it moves the students from a familiar background into a complex and new set of concepts, principles and understanding.'
2. Walter Barnard: 'Programmed learning refers to the arrangement of instructional material in progressive sequences.'
3. G.O.M Leith (1966): 'A programme is a sequence of small steps of instructional material

(called frames), most of which requires a response to be made by completing a blank space in a sentence. To ensure the required responses we given, a system of cueing is applied, and each response is verified by the provision of immediate knowledge of results. Such a sequence is intended to be worked at the learners' own pace as individualized self-instruction.'

4. Wilbur Schramm: Programmed instruction means the kind of learning experiences in which a programme takes the place of a tutor for the student and leads him through a set of behaviour, designed in sequences to make it more probable that he behaves in a given desired way in the future. In other words, he will learn what the programmes designed to teach him.'
5. R.C. Das (1993): this is a method of individualized instruction, where each individual learns by himself at his own rate. Programmed learning consists of elements of new knowledge called steps which are arranged in a sequence in such a way that a student can easily learn by himself.
6. Merriam-Webster Dictionary: Instruction through information given in small steps with each requiring a correct response by the learner before going on to the next step.

From the above-mentioned definition, I hope, you are able to grasp the concept of programmed instruction. In conclusion, we may say that, programmed instruction is a teaching-learning mechanism where content of learning presented in small, logical and sequenced steps and this demands response from the student to continue the learning process. After responding, the student is provided with the feedback which enable her to know correctness or incorrectness of the response.

### 1.2.3 Characteristics of Programmed Instruction:

Learners, we have already discussed the meaning and definition of programmed instruction; now we will discuss its chief characteristics. They are as follows:

(i) It is an innovative strategy for teaching and learning, not the assessment technique or not the solution of educational problems.

(ii) It is highly individualized, only one student can learn at one time.

(iii) It is a progressive development of concepts arranged in a logical sequence that helps the students to arrive at the behavior stated in the objective. It consists of, active response and feedback or confirmation of the correctness or incorrectness

of the response.

(iv) The teaches role is not teaching, but to construct a good programme and guide the student. It requires more creativity, imaginative efforts and hard working to develop highly individualized instruction.

### 1.2.4. Fundamental Principles of Programmed Instruction:

The various principles of learning are the basis of the programmed instruction. Hence, its principles are related to psychology of learning. There are five fundamental principles of programmed instruction. They are as follows:

#### (i) Principle of Small Steps

Learners, in this technique, the subject matter is divided into a sequence of small step. Its of these steps are known as frames. A student can learn one frame at a time and can proceed from knowing very little to mastery of the subject matter through a programme.

#### (ii) Principle of Active Responding

The principle of active responding is the second principles of programmed instruction. A student can learn in a better way if she participates in the learning process actively as well as responds while learning.

#### (iii) Principle of Immediate Confirmation

The students learn better when they achieve immediate confirmation of their response. It is a one type of motivation or reinforcement to proceed further on the programme.

#### (iv) Principle of Self-Pacing

Each and every student can proceed at her own pace in programmed instruction. A slow learner needs more time to learn than an average or a creative learner. One can learn most effectively if she learns in her own speed. This principle is based on the individual differences of the teaching-learning process.

#### (v) Principle of Student-Testing

The last fundamental principle of programmed instruction is student-testing. It enables

students to learn the content given in each frame deeply. The performance of the students is recorded as they have to write a response for each step on the response sheets given in the programme. Accordingly, this principle helps to improve the quality of programmed materials by examining the number of errors at each step or each frame.

**Check Your Progress-1**

**A. What is Frame?**

……

……

**B. Choose the correct option:**

i. One/ many student (s) can learn at one time in a PLM.
ii. PLM is an assessment technique/ innovative technique of learning.
iii. The teaches role is highly teaching/construct a good programme.

## 1.2 Types of Programmed Instruction:

Many research and experimental studies have been conducted and accordingly various types of programmed instruction have emerged. Here, we will discuss the three-basic type of programmed instruction, viz. Linear programming, Branching programming and Mathetics.

### 1.3.1. Linear Programming

Linear Programming is considered one of the most important types of programmed learning. B. F. Skinner developed this programming and hence it is known as Skinnerian programming. It is also called Extrinsic and single-track programming. It is based on psychological principles of leaning. The Linear programming is an application of operant conditioning theory of learning.

Linear programming is defined as a method of giving personalized instruction in which the students are active and they procced to next piece of learning at their own speed. Students are also provided with immediate feedback which enables them to test themselves. In this programming, a piece of information is provided to the students at a time. Then few questions are directly asked

to the students; they are instructed to think and write answers to those questions. They are immediately informed whether their responses are correct or not. The following aspects has to be considered in this programme-

- Small frame of content is presented at one time.
- A student provides her response.
- Compares the given response to the correct response give in the programme and thus gets feedback or reinforcement.
- The student is instructed what she has to do in the next step on the basis of her responses.

Frames in Linear programming

Thus, this programming is designed in a straight line in which the pupil starts from his initial behaviour to the terminal behaviour following a straight line. The subject matter is broken into several small parts which are arranged in a logical sequence. The students also achieve immediate feedbacks after responding. In this manner the pupil goes or move from one frame to the other frames till he completes the entire program.

### ❖ Characteristics of Linear Programming

- It is highly individualized; only one student can learn at one time.
- A little bit of information is provided in each step. The basic philosophy behind this is that, students learn better in small steps and also make less errors while learning in small steps.
- There is only one way or line to follow in this programming. A student goes from one frame to the other till the entire programme is over.
- The entire programme consists of many smaller frames and each frame contains single idea, example or rule.
- These frames are strictly placed in a logical order and also, they are very closely arranged to the proceeding frame so that the students make minimum errors.

- Students are provided with stimulus or signals at the initial stage of the programme.

❖ **Types of Linear Programming:**

Learners, the text of linear programming are available in various forms like- book form, computer format, teaching machine format etc. They are of six types. Study Fig-I carefully.

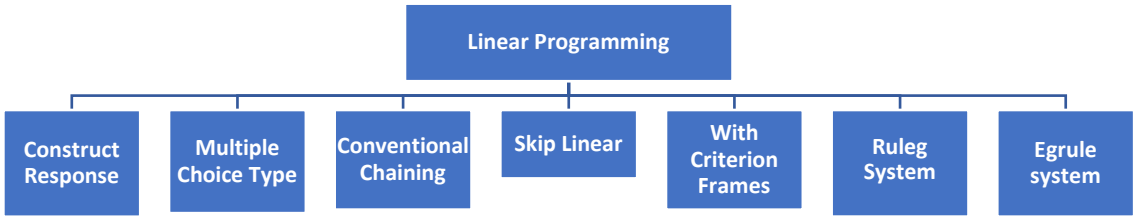



Fig-I: Types of Linear Programming

Now, we will discuss them one by one.

1. Construct Response: In this type, the learner has to construct responses during study of programmed text. It is a basic Skinnerian type programming in which a blank space is provided in each frame to construct a response.
2. Multiple Choice Type: Sydney Pressey designed this particular type of linear programming. In this type, the learner has to select a response in each frame.
3. Conventional Chaining: This particular type of format is developed by John Barlow. Here, each frame is connected to the next frame. The response of the learner to particular frame becomes the stimulus of the next frame. That means, the response of the learner to first frame becomes the stimulus for the learners in the second frame and so on.
4. Skip Linear: In this type of format, some frames can be skipped by the learners. A bright learner can skip over few frames by using skipping technique provided in the programming and average learners can go through all the frames of the programmed material.
5. With Criterion Frames: In this type, the learners are directed by some frames according to their responses at critical situation. These frames are called Criterion frames. These frames decide learning sequence of the learners along the linear path.

6. Ruleg System: In this particular format, content is organized such that rules are provided to the learners first and then the examples. The rules are given in complete form and examples in incomplete form. Learners has to complete the examples by constructing responses.
7. Egrule system: This type is just opposite to the Ruleg System. Here, content is organized such a way that examples are provided to the learners first and then the rules. The examples are given in complete form and the rules are in incomplete form. Learners has to complete the rules by constructing responses.

❖ **Structure of Linear Programming:**

Learners, already you have come to know that in programmed instruction, content matter is divided and a small piece of information is presented a time. These small pieces of information are presented by following logical sequence. Each step provides a new knowledge or new information. The learner has to elicit right responses to proceed in the programmed material. Thus, response is an essential part of the terminal behaviour of the learners. The small piece of information that a learner takes at a time is called Frames. The following three aspects are considered while framing a frame in linear programming:

1. Stimulus
2. Response
3. Reinforcement

1. Stimulus: Learners, it is already known to you that, linear programming is based on operant conditioning theory of learning; hence stimulus-response (S-R) connection is the basis for this learning strategy. First, contextual stimulus is provided to the learners which creates the situation for response. If it is not enough to elicit desired response from the students, then additional stimulus or **prompts** are used to elicit desired response.
2. Response: After getting the stimulus, the learners' duty is to elicit desired response. The nature of response depends on the form/type of stimulus; thus, response is a dependent activity. In linear programming, the functions of a response are as follows:

a. The correct response provides new knowledge or new behaviour.

b. The responses lead a learner to achieve terminal behaviour.

c. The confirmation of the responses provides the reinforcement to the learner.

Thus, responses are integral part of linear programming. In this technique, two types of responses are elicited by the learner—Construct response and Discriminant response.

1) **Construct Response**: A blank space is provided in each frame to construct a response from the learner. This response is related to the new knowledge or desired behaviour of the learner.
2) **Discriminant response:** In some cases, more than one options (generally two) are given to the learner to respond. The learner has to select the right response. The right response is integral part of the desired behaviour.

3. **Reinforcement:** The learner has to confirm her response by comparing with correct response. If her response is correct, she gets pleasure and thus receives reinforcement for the next frame or step of learning. Moreover, the correct response provides knowledge of desired change in the behaviour of the learner, which establishes new connection between stimulus and response. This is known as **conformation** in programmed learning.

❖ **Limitations of Linear Programming**

- It is a very costly method and needs a lot of time.
- This method can provide knowledge regarding the lower level of cognitive domain, e.g. knowledge of some facts.
- It is very difficult to develop a linear programmed material for higherlevel.
- It is not possible to develop linear programmed material for entire school subjects.

**Check Your Progress-2**

A. What are the various aspects that has to be considered in PLM?

B. Fill in the blanks:

i. _____developed Linear programming.

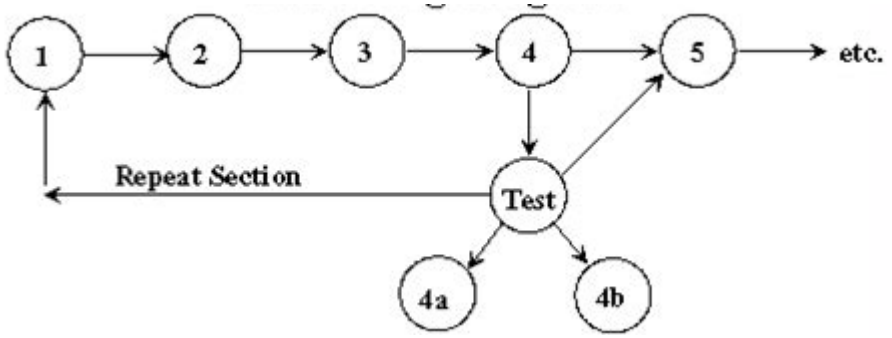
ii. The Linear programming is an application of _____of learning.

### 1.3.2 Branching Programming

Branching programming was developed by Norman A. Crowder (1980). It is also known as the Crowderian programming. It can be defined as: 'A programme which adapts to the needs of the students without the medium of extrinsic device as a computer. It is also known as intrinsic programming as the learner himself makes the decision to adapt the instructions to his/her needs.'

In this technique, a frame is given in one or two paragraph or in one full page. After that the students need to answer few objective type questions, and on the basis of that answer the PLM instructs the student to proceed to another frame. If the students answer incorrectly, they will either be returned to the original frame, or sent through a sub-program designed to remedy the deficiency indicated by the wrong answer. The students who select correct responses can advance to the next frame in the program. At each step, this process is repeated, and a student is exposed to different kinds of materials or frames depending upon the errors made by her or him.

In comparison to linear programming, the frame size and amount of information given is more and is followed by multiple choice types of questions. In this technique, more weightage is given on diagnosis than committing errors. In branching programming, frames are presented in book form, it is known as 'Scrambled Book.



## ❖ Characteristics of Branching Programming

- The students are free to provide their responses. They can select any answer out of the multiple alternatives and move towards next frame on the basis of that response.
- The provision of remedial teaching is key characteristics in this technique. If a student provides incorrect response, she needs to move through remedial frames.
- In this programming much emphasis is given on paying attention towards the difficulties of the pupils.
- This method is used to achieve the higher-order teaching objectives.
- In this method each pupil determines his own method of study.

## ❖ Limitations of Branching Programming

- Skilled, trained and motivated teachers are prerequisite for constructing this programming.
- The multiple-choice questions provided in this programme may encourage the students to guess without understanding the subject matter of the frame or without reading the content.
- It requires innumerable branching to include the entire content which is not feasible.
- The branching programme is very expensive. The cost of preparation of a programme in a printed book form or audio-visual material is quite high as the programme needs frequent revision.
- Useful for higher classes only.

**Check Your Progress-3:**

**A. Fill in the blanks-**

i. _____ developed the Branching programming.

ii. In branching programming, frames are known as_____.

B. List two characteristics of Branching programming**.**

**1.3.3 Mathetics Programming:** Thomas F. Gilbert developed Mathetics in the year 1962. The term Mathetics is derived from the Greek word 'Mathene' which means learning. It is defined as ***the systematic application of theory of reinforcement for the analysis and construction of complex repertoires which represent the mastery on subject matter***. It is a complex type of programming compared to other two types. It is very useful in achievement of very difficult skill, bringing out the desirable changes in the student's behaviour and gaining the mastery over the content.

Linear programming is associated with the change in behaviour, Branching programming is with providing remedy, and Mathetics is associated with achieving mastery over the subject.

According to Gilbert, instruction must concentrate on learner's activity, not on the coverage of the content. One of the basic concepts of Mathetics is to start with the most motivating task, and, hence in this programming, the learner starts from the last step and goes backward to reach the introductory part to conclude the learning process. That's why it is also known as backward chaining or retrogressive chaining. In other words, we may say that, the contents are arranged in a sequence in which the last and final frame (teaching element) is presented to the students as the first frame (teaching element). The instructor or programmer has to be very careful in chaining the frames, as they may lose relevance, order and logic.

The frame structure of Mathetics programming has the following stages:

1. Demonstration
2. Prompting
3. Release or response

Learners, the learning behaviour of the students is displayed in the demonstration stage. Prompts are used to produce learning behaviours under the understanding stage and in the final stage i.e. in release stage, exercises are provided to the students on the learning behaviour in which they have to achieve the mastery. There are two types of frames- 1. Demonstration frames 2. Prescription frames.

Learners, it is based on three principles. They are

- Principles of Chaining,
- Principles of Discrimination, and
- Principles of Generalization.

Moreover, Mathetics programming is based on following assumptions-

1. Chaining of responses helps in learning to reach up to mastery level.
2. Reverse chaining of stimuli helps in learning, i.e. from whole to part, from Complex to simple.
3. Completion of task provides motivation to students.

In this technique, responses are structured and determined by the programmer. Completion of task provides reinforcement to the students. Wrong responses are ignored. Error helps in discrimination but not in learning. Its main purpose is to develop mastery of the content. It used for higher classes useful for complex and difficult task. It is useful for developing concepts of mathematics and grammar. It can be used in Distance Education too.

- **Characteristics of Mathetics Programming**

  - The students can learn from their own responses.
  - The students can gain mastery on the subject matter without the presence of the teacher.
  - Completion of a task is considered as a source of reinforcement as the students get reinforcement by confirming their responses.
  - By this method, chain, dissemination and generalization are used in learning.
  - In this strategy, importance is given to the mastery on subject matter and it is encouraged by using retrogressive chaining sequence.

- **Limitations of Mathetics Programming**

  - It is not applicable to all types of subjects; hence, its application is very limited.
  - The process of preparing this programme is difficult and hence needs very efficient, skilled and motivated programmer/ teacher.
  - Main emphasis is on mastery over the subject matter rather than changing the behavior of the students.
  - Retrogressive chaining of stimuli if not effective for achieving desired terminal behavior.
  - It is not possible to achieve higher objectives by applying this method.
  - The provision of remedial teaching is not available in this method.

Check Your Progress-4

A. Who developed Mathetics?

B. What are the various stages of frame structure of Mathetics programming?

## 1.4 Teaching Machine:

Educational Technology (ET)is the need of the hour to make the teaching -learning processes more effective as well as efficient. Educators and psychologists conduct researches and experiments to make teaching-learning process less time consuming, less laborious and individualized. Learners, you have already learnt that educational technology is the combination of hardware, software and systems approach. Teaching machine is a mechanical device, it belongs to the hardware approach of educational technology. Educational materials (software approach of ET) are presented to the students through teaching machine and, thus students are taught by it. It was first invented by Sidney L. Pressey in the mid-1920s. Originally, multiple-choice questions were administered by this machine. The machine could be set in a way that it moved on only when the student got the right answer. Tests were arranged to assess learning. Later on, Norman A. Crowder modified the idea of Pressey.

B.F. Skinner had developed a different type of machine to present the programmed learning materials. This machine was used to direct learning with positive reinforcement. Skinner advocated the use of teaching machines from preschool aged to adult learners i.e. for a broad range of students. Teaching machines are exclusively designed for teaching.

### 1.4.1 History of Teaching Machine

Teaching machine is a device that presents series of problems and provides immediate "reward" or reinforcement to students when they give the correct answers to the posed questions (Holland, 1960). Learners, you have already found that Sidney L. Pressey in the mid-1920s, developed and used machines for teaching -learning. During 1926-27, he developed the Drum Tutor. This teaching and testing device presented questions to the student until she/he responded correctly. In the mid-1950s, the psychologist B.F. Skinner devised programmed materials that led to the development of several kinds of teaching machines. Most of these machines had been replaced by computers by early 1980s. The use of computers for self-teaching is known as Computer Assisted Instruction, or CAI. In the succeeding unit, you will be learning about CAI.

Pressey, for his pioneering work in the field Teaching Machine, known as father of teaching machines. Pressey's machine was strongly influenced by Thorndike and his laws. In the year 1926, he published a paper on use of teaching machine in schools and society. Pressey showed learning was facilitated by automated- instruction by providing immediate reinforcement, individual adjustment of pace and active responses. He had done impressive work in the world of education by providing information in a sequence and by immediate feedback, with active participation of learner. However, at that time global education was highly influenced by teacher-oriented and theory-based learning and accordingly, not prepared for this type of changes in the education system.

The use of such machines was increased day by day. B.F. Skinner invented a well-designed teaching machine for the PLM developed by him. He came up with a box-like mechanical device that fed questions to students, rewarding correct answers with fresh academic material. Wrong answers simply repeated the old question. After the work of Pressey and Skinner, a number of teaching machines were developed by various psychologist and educationist. These had wonderful effect on the learning process. Teaching machines are very successful in drilling practices and hence they are very beneficial for small children.

**1.4.2. Meaning and Characteristics of Teaching Machine:** Learners, a Teaching Machine is an auto-communicative device by which is designed to be operated by an individual student. Here, the students are provided with a question or problem by some form of display on the machine and the students have to respond either by writing or pushing a button to provide an answer. The machine displays whether the answers are right or wrong; in some cases, the reason for being right or wrong is also provided to the students. Generally, the following three basic characteristics are common in a teaching machine.

- First, the student learns according to her/his own pace which best suits his individual abilities rather than at a standard pace determined by the teacher for a group of students in usual classroom or lecture presentations.
- Second, active and appropriate response in the part of the student is must to learn through a teaching machine.
- Third, for each and every response, the student receives immediate confirmation or correction. This means that the student is able to know about her mistake and status of her own learning. Moreover, the student is not exposed to any ridiculous or unwanted situation

due to her mistake as the learning is taking place through a machine.

We may summarize the characteristics of teaching machine are as follows:

a. A teaching machine presents as well as elicit information from the students.
b. The responses of the students are recorded by the machine. This estimates the level and amount of learning of the students.
c. It informs the students about their progress by showing correct and incorrect responses. This restricts cheating.
d. Teaching machine facilitates teaching process.
e. It also restricts the students behaviour.

### 1.4.3 Components of Teaching Machines

Learners, although there are different types of teaching machines, the main components that are present in every type of teaching machine are discussed here in the following points:

(i) **Content:** The information or knowledge that are stored in a teaching machine for the learner are the contents of a teaching machine. These are organized according to the principles of psychology. All the necessary information related to the topic are divided into small frames and arranged in a logical sequence and then presented to the students. These are prepared in the form of programmed text, audio or/ and video programme or in the form of computer software.

(ii) **Medium of Transformation:** The contents prepared for a teaching machine are presented to the students through a proper channel. This channel is known as the 'medium of transformation'. This medium could be a book, audio and audiovisual programme, computers or other similar devices. Through these mediums the students can learn at their own pace, as moving from one frame to another frame is highly individualized. Thus, mastery of content can be achieved by each and every student according to her learning ability.

(iii) **Responding: S**ome questions are given in each frame of the teaching machine to make the students active. **According to** the type of teaching machine, they may be MCQs, fill in the blanks, matching questions and so on. Thus, after studying the content, students have to answer those questions and then only they can move to the next frame. Thus, response from a student is must in a teaching machine.

(iv)**Feedback:** On the basis of the responses made by the students, feedback is provided to them. Thus, they are able to know what they have actually learnt. If the response is correct, they are allowed to move to the next frame; if the response is incorrect, they are given the necessary information and after learning the concept they are able to move ahead. It is a very important component of the teaching machine as self-assessment is considered as very important for students.

### 1.4.4 Advantages and Disadvantages of Teaching Machine

Every aspect has some advantages as well as disadvantages; and accordingly teaching machines also have advantages and disadvantages. In the following points we will discuss them in brief.

**Advantages:** Teaching machines has brought many advantages to the educational environment. They are-

1. The students get an opportunity to study at their own pace in a teaching machine.
2. Here, feedback is immediate as a result of which the responses of the learner are reinforced without delay. This also helps in making learning more effective.
3. The subject-matter in a teaching machine is easy to comprehend for the students as they are sequentially and systematically structured and presented in small amount.
4. Teaching machine facilitates learning by motivating the student to work independently without the help of teachers. The continuous interaction between the learner and the programme in the teaching machine results in better learning.
5. Unlike the other media such as tv, students were active while they were using teaching machine during their learning process. It is a kind of private tutor which makes the students attentive during the learning process.
6. Since it gives immediate feedback, students are able to realize their level of learning without waiting for an hour test or final examination.
7. Teaching machines provide the accurate record of the responses of the learner. This provides opportunity for the teachers to analyze the responses of the students. This helps the teacher to guide to the learner and to modify or revise the programme for making it more effective.

Disadvantages

Teaching machines were used by the teachers and educators in the advanced countries of the world as instructional aids, but they had several limitations too. They are discussed as follows:

1. They are very expensive Hence, the developing countries like India cannot afford to use teaching machines in their educational and training institutions at a reasonable scale.
2. The basis of Teaching machines are the principles of operant conditioning and this was developed from experiments on animal learning. Hence, some sorts of doubt may arise on how far these principles can be used for better and higher types of human learning.
3. The assumption that immediate feedback increases the motivation of the learners is not accepted by all. Human beings tend to think over and over to find out his difficulty in his performance.
4. Although the students can learn according to their own pace of learning, readymade structure of the programmes often fails to create curiosity and thinking ability of the learner. It becomes uninteresting for the intelligent students who like to meet challenging tasks in learning.
5. As human touch and lively interaction is absent in the learning process, there is dearth of flexibility and interest in the system for promoting effective learning

**Check Your Progress-5:**

A. Choose the correct option:

i. Teaching machine belongs to the hardware approach/ software approach of educational technology.
ii. Teaching machine was first developed by B.F. Skinner / Sidney L. Pressey.
iii. Teaching machines are exclusively designed for teaching/ learning.

B. List the components of Teaching Machines

## Answers to the Check Your Progress:

**Check Your Progress-1**

A. In PLM, the subject matter is divided into various small parts or piece of information and then all these pieces of information are presented to the students in a logical sequence. This piece of information is called frame**.**

B. S i. one, ii. innovative technique of learning, iii. construct a good programme.

**Check Your Progress-2**

A. The following aspects has to be considered in PLM

- Small frame of content is presented at one time.
- Only one student provides her response at one time.
- Compares the given response to the correct response give in the programme and thus gets feedback or reinforcement.
- The student is instructed what she has to do in the next step on the basis of her responses.

B. i B. F. Skinner, ii. operant conditioning theory,

**Check Your Progress-3**

A. i. Norman A. Crowder, ii. Scrambled Book

B. try to do yourself (hint: subsection: 1.3.2)

**Check Your Progress-4**

A. Thomas F. Gilbert

**B.** There are three various stages of frame structure of Mathetics programming. They are-

1. Demonstration
2. Prompting
3. Release or response

**Check Your Progress-5**

A. i hardware approach, ii. Sidney L. Pressey, iii. Teaching

B. Components of Teaching Machines are- Content, Medium of Transformation, Responding: and Feedback.

# Unit-2
# COMPUTER ASSISTED INSTRUCTION

**Structure**


2.0 Objectives
2.1 Introduction
2.2 Computer Assisted Instruction
  2.2.1 Definition of Computer Assisted Instruction
  2.2.2 History of Computer Assisted Instruction
  2.2.3 Operations in Computer Assisted Instruction
  2.2.4 Role of Teacher in Computer Assisted Instruction
  2.2.5 Experts Needed in Computer Assisted Instruction
2.3 Types of Computer Assisted Instruction
  2.3.1 Advantages of Computer Assisted Instruction
  2.3.2 Limitations of Computer Assisted Instruction
2.4 Let Us Sum Up
2.5 Key Words
2.6 Terminal Questions
2.7 Suggested Reading
2.8 Model Answers to 'Check Your Progress'


## 2.0 Objectives

After going through this unit, you will be able to:

- Elaborate the concept of Computer Assisted Instructions
- Identify the key characteristics and components of Computer Assisted Instruction
- Analyse the various types of Computer Assisted Instruction
- Critically evaluate the importance of Computer Assisted Instruction

## 2.1 Introduction

Technology has completely revolutionized the way in which people interact with each other and at the same time has brought changes in the world around us. As a result of this, it is being openly recognized that a strong base to use technology as a tool is necessary for students, for their bright future. Technological developments lead to changes in the way we work and therefore required competencies are also changing. The possibility of transforming learning has been greatly enhanced by the use of these technologies. With the rise of social media, education can be delivered in many versatile ways. Educational technology is a new concept which has emerged during the last few decades only and revolutionized educational thinking and practice. Modern Educational Technology has its potential in

present day schools, in the teaching of content to students, in the examination system, in research and development, in systematic reforms and above all, in the field of teacher education. This has resulted in overcoming many problems and now knowledge can be achieved online, anytime and anywhere.

In this unit, you will learn about the significance of Computer Assisted Instruction which is one of the most popular trends in the educational learning teaching process. Computer Assisted Instruction or briefly known as CAI is an interesting innovation in educational technology. Although it is still in an experimental stage, its marvels have been demonstrated and seem to revolutionize the whole spectrum of education. It has better flexibility and more versatility than any of the teaching machines. It can cater to the individual needs of many students at a time and record all the responses of all the pupils with reliability. The time consumed by an individual student in responding to a question and extent of correctness are also recorded by the computer. All this helps the educator in planning instruction and providing relevant materials.

## 2.2 Computer Assisted Instruction

A computer plays an important role in each and every sector of life. It is generally defined as an electronic machine which works on the principles of prolonged learning that are aimed at individualized instruction to meet the special needs of individual learners. Computers are useful in the following ways:

- They can save a lot of work.
- Through the Internet, we can have convenient access to information and can communicate with people sitting thousands of miles away.
- We can perform huge mathematical calculations in seconds.
- It provides security, speed and convenience in different sectors like banks, hospitals, travel agencies, industries, etc.
- Computer plays an important role in education too.

In the field of education, computer is used in teaching. It has proved to be a powerful medium for teachers to enhance the quality of instruction. There are a number of functions which are performed by computers in education:

(i) Classifying students and creating strategies for each of them.

(ii) The teacher uses a computer for preparing timetables and schedules.

(iii) It is used for evaluating the students and maintaining a record of pupil's efficiency.

(iv) It provides information for guidance and further work.

(v) It can act as teacher for students and can give immediate feedback to them.

In advanced countries, the computer acts as an efficient and effective media of instruction and these instructions which are imparted by computer are known as 'Computer Assisted Instruction'. There are different types of educational uses of computer and not every use of a computer in the classroom is considered as Computer Assisted Instruction (CAI). In CAI, instructions are presented through computer programmes, or the computer is performing an interactive task of teaching-learning. It has been found that students learn better when they see, hear and interact in the learning process.

### 2.2.1 Definition of Computer Assisted Instruction

'Computer Assisted Instruction' is a learning method through the use of computers. It can be used to teach difficult concepts to students. With the help of these instructions, a computer can easily capture the student's attention because most of these programmes are interactive and engage students in various tasks. Immediate feedback also helps in gaining the attention of students. Thus we may define Computer Assisted Instruction as follows:

'When computer is used as a tool to facilitate the learning process through an interactive technique, whereby a computer is used to present instructional material and is utilized to help students in all areas of curriculum.'

CAI is defined by Bhatt and Sharma (1992) as 'Computer Assisted Instruction is an interaction between a student, a computer controlled display, and a response entry device for the purpose of achieving educational outcomes'.

The salient features of Computer Assisted Instructions are as follows:

- CAI is an interesting innovation in education technology, which has revolutionized the whole spectrum of education. It can cater to individual needs of many students at a time and record all the responses of students with reliability.
- CAI provides an opportunity for systematically organized maximum learning for all learners.
- CAI is a method of interaction between a computer device and a learner, for helping the learner to get information at his own pace, to achieve the desired instructional objectives.

Computer has contributed a lot in each and every sector of life. Computer assisted instruction (CAI) has emerged as an effective and efficient media of instruction in the advanced countries of the world. In fact, CAI is being used in formal and non-formal education at all the levels. In India too, computer has been introduced in most of the areas such as data processing, decision making. It has also impact on the working methods of research and development in the fields of science and technology. The computers are being used in almost all areas of life i.e., transportation, communication, national defence, scientific research and education.

CAI is a natural outgrowth of the application of the principles of programmed instruction or learning. The main objective of programmed instruction is to provide individualized instruction just to fulfill the special needs of the individual pupil. In order to achieve this objective, some efficient device is required. This device should be flexible and it can store huge amounts of organized information. The device may enable a person to use some selected part of the stored information. A computer fulfils all these requirements. It can store the organized information, it can process the information suiting to the needs of individual learner. In short, CAI covers the entire educational system by proving itself and useful tool in teaching various subjects.

If we see the origin of a computer, we shall find that some technicians attempted if a machine could be programmed to interact with a man. The first commercial computer was operative in 1951 in Census Bureau. First CAI attempt was made around 1961 when the University of Illinois produced Programmed Logic for Automatic Teaching Operation (PLATO). Hence, the use of computer in general education started from early sixties.

There are two contradictory views, regarding the use of computers in general education:

(i) CAI provides opportunities for systematically organized maximum learning for all learners. It provides complete individualizing instructions. The increasing amount of information and lack of qualified teachers make the use of CAI very essential.

(ii) Second viewpoint is its criticism. The critics see computer as an agent of destruction of human qualities. According to them, no computer can match a person's versatility and the emotional aspect. CAI mechanizes human brain. In other words, human beings are converted into machines.

There are many educationists and psychologists who have been trying to find out ways in which electronic information processing may help the teacher in individual instruction. One of the important and prominent approaches is to use computer as a teaching machine. This approach is referred to as computer aided instruction or computer assisted instruction abbreviated as CAI.

Computer aided instruction is a substantial innovation. A computer is a high speed data processing machine. The first large mechanical computer called as an analytical engine was designed during the nineteenth century by Charles Babbage, a British Mathematician for computing astronomical and mathematical tables. The equipment was not of much success.

During the later part of the nineteenth century Herman Hollerith developed a machine for processing cards on which information was stored

by means of punched holes. This machine was used to speed the tabulation of census results in U.S.A.

One of the early computers operating on the basis of electric pulses rather than mechanical switching was placed in operation at University of Pennsylvania in 1946. This machine was named as Electronic Numerical Integrator and Computer (ENIAC).

CAI can deal with the problem of quality in education more effectively. A learner can make progress at one's pace, receive and choose the material, sequencing and level of instruction freely. As each learner's performance is automatically recorded and can be fed back to the teacher, learner's performance can be evaluated and education be provided according to the strategy that is best suited to the individual. The teacher can be relieved from the daily routine and monotonous drilling activities. It has been experimentally proved that any lesson in any subject can be programmed for CAI if the objective is clearly defined and learning materials are represented in words, visuals and experiments.

CAI installation usually consists of individual learning booths each with a console. Every student sits in front of the console with a television screen displaying information. A complete learning package suiting to his individual needs is presented, sequentially. This package may consist of video as well as audio tape-recordings, films, slides, film strips and so on. The student may make queries to the computer by means of a key-board and get answers in printed forms. The student may write the answers directly on the cathode ray tube display screen with a "light-pen" which can be evaluated by the computer. On completion of a programme, the computer records his progress and prints out a report for the teacher.

## Computer Based, Computer Assisted and Computer Managed Instructions

Computer Based Instruction (CBI) is a broad term and can refer to virtually any kind of computer use in educational settings, including tutorials, drills and practice, simulations, instructional management, database development, supplementary exercises, programming, writing using word processors, etc. These terms may refer either to stand-alone computer learning activities, or to computer activities, which reinforce material introduced and taught by teachers.

Computer Assisted Instruction (CAI) is a narrow term and most often refers to drills and practices, simulation activities or tutorials, offered either by themselves or as supplements to traditional teacher directed instruction.

Computer Managed Instruction (CMI) can refer either to the use of computers to organize student data by school staff and make instructional decisions or to activities, in which the computer evaluates students' test

performance, guides them to appropriate instructional resources, and keeps records of their progress.

### 2.2.2 History of Computer Assisted Instruction

In the 1950s and 1960s, CAIs started mainly in the US at Stanford University. Suppes, Kemeny, Kurtz and Bitzer were the pioneers to use a computer as part of the learning process. Early Computer Assisted Instruction programs were rudimentary by today's standards, with mainly text-based interfaces. It was difficult for CAI to become a popular tool at that time, with large physical size and high cost of the computer equipment. With improvements in computer technology and development of the microcomputer, along with experiments in psychology and cognitive studies, computers are becoming increasingly popular. Bitzer was the one who first realized the importance of graphics and sound in the teaching process. Initially, CAI programs simply tried to teach a particular topic without a base of any specific educational philosophy.

#### Basic Assumptions of Computer Assisted Instruction

CAI is an individualized instruction which is based on certain assumption, some of which are given below:

- CAI can be arranged for thousands of learners at a time. Hence, it can cope with the problem of quality and quantity in education for large number of individual learners at a time.
- Individual needs according to their capability and interest can be met with the help of CAI. It is completely individualized instruction, hence one can learn at his own pace.
- Immediate feedback is provided in this type of instruction.
- In CAI, the performance of students can be successfully and accurately recorded during the course and it can be used by the teacher to evaluate the learner's performance. The teacher can also plan a suitable strategy on the basis of pupil's response.
- CAI assumes that every topic cannot be taught by the same procedure and various words, pictures and experiments are used differently for different programmes.
- CAI can be used in all type of teaching–learning programmes.

#### Important Characteristics of Computer Assisted Instruction

- **Individual difference:** CAI is based on individual differences. Attention is given to the learning pace of the pupil, so that each student can learn at his own convenience.
- **Immediate feedback:** There is a provision of immediate feedback in CAI, which enhances the pupil's activity and attracts his attention.

- **Active responding:** This type of instruction demands the response of students, and hence, each of them responds continuously as he receives the instruction.
- **Small units:** All the units of learning are broken down into small sub-units and elements, in accordance with Skinner's approach of teaching in small steps.
- **Different methods and techniques:** In CAI, different methods and techniques are used in the form of graphs, pictures and experiments. A variety of techniques are used which help in stimulating the interest of the people.
- **Time saving:** It is very useful in terms of time. It saves the time of the teacher from the routine activity of giving information, as a result of which he may get involved in some innovative activities, student guidance, etc.
- **Flexible:** CAI is a flexible programme and it can be used by the student at any time or place.

**Technologies of Computer Assisted Instruction**

Computer Assisted Instructions mainly involve three components as follows:

(a) ***Hardware:*** The computer as a machine is hardware in CAI, as we certainly need a computer to carry out instructions with the help of this method. A teacher must have the workable knowledge of a computer.

(b) ***Software:*** Software is required to be fed to a computer, without which it cannot work or provide instructions to learners. Software programmes contain instructions which can be understood by the computer. Two types of software are used in CAI: (i) application software and (ii) system software. Application software includes instructions to the computer for carrying out the complete function required by the user. On the other hand, system software is needed to organize the resources of a computer to carry out application tasks mentioned in the application programme.

(c) ***Courseware:*** It is the base of instruction that is imparted to the learner by CAI. Courseware includes experts in the subject; in methodology and strategies of teaching the subject, in instructional psychology and in audiovisual preparation and use.

### 2.2.3 Operations in Computer Assisted Instruction

CAI system has been used at all levels of education ranging from elementary school to post graduate study and on job training in almost all subjects. Atkinson (1968) designed a programme for teaching reading to infants. The child first

must learn to identify letters. This task of identifying letters is done in three stages of the programme.

**(i) First Stage**

A model letter appears on the projector connected with a computer, while three letters are presented on the screen. Then the recorded voice instructs the child to look at the letter on the projector. Different letters are shown on the projector. Training is imparted to the child in identifying the letters.

**(ii) Second Stage**

At this stage, the child masters the identification of single letter. During this phase the child learns to discriminate pairs of letters.

**(iii) Third Stage**

During this stage, two-three letters combinations are presented on the screen. The child is asked to touch one symbol out of the two combinations which are identical.

A recorded voice asks the child to touch and say the word that would be formed by combining the letters on the side and top of the screen. Errors made by the child are automatically recorded in the computer. The child thus receives practice. The drills that various learners receive may be entirely different from each other. After mastery of simple reading skills, the child proceeds to acquire successively more complex skills. Computers have been designed to store and retrieve vast amount of information.

### 2.2.4 Role of Teacher in Computer Assisted Instruction

It is feared that the use of CAI in teaching-learning will relegate the place of the teacher. To some extent its use may eliminate teachers from teaching scene. But this fear is false and baseless.

CAI has proved powerful tool for the teacher in the instructional process. Of course, there is some change in teacher's role.

With CAI directly interacts wit the students individually and with the teacher. Teachers are to play their role in CAI. Human teachers cannot be eliminated from teaching-learning process. We can highlight the role of a teacher in CAI in the following manner:

**(i) Use of New Tools**

CAI provides the teacher some chances to use new tools. This use will enhance the person's satisfaction. Also it will increase the individual's efficiency. The CAI can compute accurately and rapidly huge amount of data. It can produce elaborate graphs and drawings.

**(ii) Compatible**

CAI is compatible. It can be used side by side. CAI is a flexible system of instructions It can very promptly evaluate the performance of individual student. The teacher can devote his time for more creative activities.

### 2.2.5 Experts Needed in Computer Assisted Instruction

Computer aided instructions need the help of the following experts:

**(a) Computer Engineer**

A computer engineer is a technical person and knows about basic principles and techniques of programming.

**(b) Lesson Writer**

The lesson writer is an expert who is familiar with lesson writing. Lesson writers may be experienced teachers or an experienced teacher may be a lesson writer. He knows theories of learning.

**(c) System Operator**

He knows the system thoroughly and can cope with all commonly-occurring failures of software and hardware in the system.

**Check Your Progress-1**

1. Define Computer Assisted Instruction.

   _____

   _____

2. Name the pioneers of CAI.

   _____

   _____

3. What are the salient features of Computer Assisted Instruction?

   _____

   _____

## 2.3 Types of Computer Assisted Instruction

Computer Assisted Instruction can be used in several ways to enhance the field of education. Depending on the services available to a learner, it can be used in various forms and types. Thus, for providing self-individualized instruction we may divide CAI as follows:

- **Drill and practice:** A large number of topics require drill and practice, but in a classroom it is not possible for the teacher to repeat the topic again and again. Hence, CAI can help learners as it provides them different types of drill and practice programmes covering specific topics, which cannot be understood without practice related to a particular subject. Drill and practice is actually the simplest of the functions performed by CAI. Computers have a very good memory; moreover they can record all the responses of the pupils, and hence present the next question on the basis of his previous answer. Drill and practice is mostly used by students of lower classes. It is also very helpful in easing the work of the teacher. At present, drill and practice is used in learning basic mathematics and language skills. Computer games have been used to improve learning during drill and practice lessons, and can effectively increase proficiency. Sound, graphics and allowing the player to gain points by giving correct answers stimulates motivation and effectiveness in learning.
- **Tutorial:** In tutorials, instructional material is presented and the learning process takes place by interaction. So in this type of CAI, computers are engaged in real teaching. As interaction is the main factor here, computers can play the role of a tutor by maintaining a perfect interaction with individual students. In a tutorial programme, the lesson is designed into a learning programme and this programme presents the students with a series of frames. Each frame either introduces a new piece of information or reinforces an old one. Each frame ends with a question that the student must answer before going on to the next one. The answer to the question in one frame determines which frame the student goes to. A key feature of this learning process is the complex feedback system, which can provide remedial instructions, depending upon incorrect response offered by the student. In this type of instruction, not only the material is presented before the students but proper learning takes place as students have to participate. At the end of the tutorial, participants are given a summary statement that helps to recall what has been taught.
- **Educational games:** Games could be used in a very innovative way. There are many games which can increase the intellectual level, curiosity and motivation of children. It has been found that children learn more with the help of these games. Even adults enjoy learning through games. These games can even be used by the teacher as a reward for learning. Games encourage the participants to put in more efforts.
- **Simulation:** This technique can be used to teach individuals about the importance of preparedness, handling situations, and the effects of various types of learning. It is used to train students. In this type of

CAI, students are made to face real situations. For example, simulation may put students into a real-life situation. It can help them to learn a lot of things which they cannot learn by facing exactly the same procedure in real life.

- **Discovery:** This type of CAI provides a large amount of information, specific to content and challenges the learner to analyse, compare, infer and evaluate themselves based on their exploration of data. This technique can be used by learners to create novel ways of addressing various problems based on the information that is provided to them.
- **Problem-solving:** This type of CAI helps in teaching specific problem-solving skills and strategies to the learner. It helps students develop skills in logic, solve problems and follow directions, and is generally used to augment higher order thinking skills. This type of instruction focuses on finding the answer. Here, learners do their own programming and the ultimate feedback is a solution of their problem. Problem-solving techniques can be used by presenting multiple choices to participants, asking them to solve the problem, and providing feedback about their choices. Students can divide or analyse the problem into small constituents and can devise a systematic procedure for its solution. There are various programmes available for different type of students to increase their thought process and analysing power. Thus students are able to solve their problems in real life as well.
- **Experimental work:** Computer Assisted Instructions can prove very helpful in developing countries where it is not possible to establish well-equipped laboratory and give practical knowledge of each task. Students can learn a lot of practical work without even performing it in reality. All experiments of science can be understood by viewing the procedure in animations. Not only in science, but in all subjects practical knowledge can help a student to learn new things, and thus his background about the subject becomes very strong.
- **Self-study:** In this type of CAI, the student is able to know about his own weaknesses and strong points. As computers have very good memory and they store everything done by students, he can learn to control those mistakes. Moreover, computers facilitate assignments, help in self-study and tests, provide progress charts, etc.

Various types of Computer Assisted Instructions help students in various ways, which are generally beneficial for each and every student. In the education of mentally challenged or physically challenged pupils, CAI plays a significant role as it can provide them the needed learning experience with quite negligible effort. Thus, Computer Assisted Instructions are playing leading roles, not only in teaching but also in boosting the confidence of students.

### 2.3.1 Advantages of Computer Assisted Instruction

- **Higher achievements:** The use of CAI is supplementary to conventional instruction as it renders higher levels of achievement than use of traditional instruction alone.
- **Fast learning:** Students learn faster with CAI than traditional instruction alone. It is easy to remember things which are shown to pupils with the help of CAI, as it is more interesting for them and increases their retaining power.
- **Positive attitude:** The use of CAI leads to more positive attitude towards subject material, quality of instruction, schools in general and self as learner. This positive attitude results in better learning.
- **No biasing:** There is no possibility of bias in CAI.
- **Cost effective:** Computer Assisted Instructions appear to be less costly than other instructional methods, such as teacher directed instructions and tutoring.
- **Objectivity:** CAI is more objective than teachers.
- **Other beneficial outcomes:** CAI is also very helpful as there are a number of other benefits like better control of class, school attendance, motivation and student cooperation and collaboration.

***Other advantages of CAI***

There are many other advantages of CAI. They are as follows:

- Computer Assisted Instructions are helpful as they allow each student to learn at his own pace. One student can move to more demanding educational activities without disrupting anyone else's learning in a class. Simultaneously, it is possible that other students can repeat certain learning activities as required.
- Learning activities for children on computers are on multiple levels. Curriculum material embedded in learning activities is mastered by students and they become more adept at using computers.
- This type of approach also provides a more standardized quality teaching environment. The instructor has more time to spend with individual students. Individual instruction also satisfies theoretical requirements of a good learning environment.
- The computer's capacity to allow learners choices over content as well as provide immediate feedback to learner's responses makes it particularly well-suited to motivate students as he progresses. Immediate feedback also boosts their confidence level which helps them to proceed to their next level.

- Students do not feel embarrassed even if they make silly mistakes. Thus, they experience less fear of failure and more challenge in their work.
- The computer never gets tired by giving instructions, so CAI can be used continuously for hours.
- It allows teachers for more meaningful contact with students.
- A good amount of information is made available to the learner, more easily than any other media.
- It provides maximum amount of flexibility to students.
- The students can choose content, sequence and level of instruction, according to their requirement.

### 2.3.2 Limitations of Computer Assisted Instruction

Although Computer Assisted Instructions are very useful in various ways, they also have their limitations that are very difficult to overcome. These limitations are as follows:

- It will harm the equity of education and increase educational costs. Low budget schools and low-income students usually cannot afford a computer. Therefore, for poor schools and students it will create unfair educational conditions. On the other hand, expensive hardware and software also becomes a big obligation for schools.
- Basic technological knowledge is necessary for both teachers and learners to use this technique. No student can benefit from the computer if he does not know how to use it.
- Computers cannot handle unexpected situations. Due to the limitations of a computer's artificial intelligence, computer technology is unable to deal with unexpected learning problems and respond to learners' questions immediately as teachers do.
- There are many disciplines which have no instructional package available or these packages are still in planning or developmental stages.
- This innovation may dehumanize the educational system by making teaching–learning process lifeless and mechanical.
- Physical problems, like vision disorders, are reported in individuals as a result of continued computer usage.
- Sometimes, the mechanical use of computers may prove boring.
- It is very difficult to adjust the curriculum and timetable of schools in accordance with CAI.

- All students are not able to access CAI, hence it may discourage them and give them a feel of inferiority.

### Check Your Progress-2

1. Identify some of the key roles of problem-solving techniques.

   _____

   _____

2. Give at least three advantages of CAI over traditional instruction.

   _____

   _____

3. What are the limitations of Computer Assisted Instruction?

   _____

   _____

## 2.4 Let Us Sum Up

- A computer plays an important role in each and every sector of life. It is generally defined as an electronic machine which works on the principles of prolonged learning that are aimed at individualized instruction to meet the special needs of individual learners.
- Computers are useful in the following ways:
  - o They can save a lot of work.
  - o Through the Internet, we can have convenient access to information and can communicate with people sitting thousands of miles away.
  - o We can perform huge mathematical calculations in seconds.
- There are a number of functions which are performed by computers in education:
  - o Classifying students and creating strategies for each of them.
  - o The teacher uses a computer for preparing timetables and schedules.
  - o It is used for evaluating the students and maintaining a record of pupil's efficiency.
- When computer is used as a tool to facilitate the learning process through an interactive technique, whereby a computer is used to present instructional material and is utilized to help students in all areas of curriculum.

- In the 1950s and 1960s, CAIs started mainly in the US at Stanford University. Suppes, Kemeny, Kurtz and Bitzer were the pioneers to use a computer as part of the learning process.
- Bitzer was the one who first realized the importance of graphics and sound in the teaching process.
- CAI is an individualized instruction which is based on certain assumption, some of which are given as follows:
  - CAI can be arranged for thousands of learners at a time. Hence, it can cope with the problem of quality and quantity in education for large number of individual learners at a time.
  - Individual needs according to their capability and interest can be met with the help of CAI. It is completely individualized instruction, hence one can learn at his own pace.
  - Immediate feedback is provided in this type of instruction.
- CAI is based on individual differences. Attention is given to the learning pace of the pupil, so that each student can learn at his own convenience.
- CAI mainly involves three components, namely hardware, software and courseware.
- CAI can be used in several ways to enhance the field of education.
- A large number of topics require the method of drill and practice, but in a classroom it is not possible for the teacher to repeat the topic again and again. Hence, CAI can help learners as it provides them different types of drill and practice programmes.
- In tutorials, instructional material is presented and the learning process takes place by interaction.
- Games could be used in a very innovative way. There are many games which can increase the intellectual level, curiosity and motivation of children.
- Simulation technique can be used to teach individuals about the importance of preparedness, handling situations, and the effects of various types of learning.
- Discovery CAI provides a large amount of information, specific to content and challenges the learner to analyse, compare, infer and evaluate themselves based on their exploration of data.
- The use of CAI is supplementary to conventional instruction as it renders higher levels of achievement than use of traditional instruction alone.
- The use of CAI leads to more positive attitude towards subject material, quality of instruction, schools in general and self as learner. This positive attitude results in better learning.

- Computer Assisted Instructions appear to be less cost effective than other instructional methods, such as teacher directed instructions and tutoring.
- CAI is helpful as there are a number of other benefits like better control of class, school attendance, motivation and student cooperation and collaboration.
- Although Computer Assisted Instructions are very useful in various ways, they also have their limitations that are very difficult to overcome. Some of the limitations are:
  - o Basic technological knowledge is necessary for both teachers and learners to use this technique. No student can benefit from the computer if he does not know how to use it.
  - o It is very difficult to adjust the curriculum and timetable of schools in accordance with CAI.
  - o All students are not able to access CAI, hence it may discourage them and give them a feel of inferiority.

## 2.5 Key Words

- **Computer Based Instruction:** It can refer to virtually any kind of computer use in educational settings, including tutorials, drills and practice, simulations, instructional management, database development, supplementary exercises, programming, writing using word processors, etc.
- **Computer Managed Instruction**: It can refer either to the use of computers to organize student data by school staff and make instructional decisions or to activities, in which the computer evaluates students' test performance, guides them to appropriate instructional resources, and keeps records of their progress.
- **Hardware:** The computer as a machine is hardware in CAI, as we certainly need a computer to carry out instructions with the help of this method.
- **Software:** Software is required to be fed to a computer, without which it cannot work or provide instructions to learners. Software programmes contain instructions which can be understood by the computer.
- **Courseware:** It is the base of instruction that is imparted to the learner by CAI. Courseware includes experts in the subject; in methodology and strategies of teaching the subject, in instructional psychology and in audiovisual preparation and use.

## 2.6 Terminal Questions

1. List some of the key functions performed by computers in education.
2. Define the following terms.
   (i) Computer Based Instruction (CBI)
   (ii) Computer Managed Instruction (CMI)
3. Write a short note on the history of Computer Assisted Instruction.
4. What are the basic assumptions of Computer Assisted Instruction?
5. What are the two types of software used in CAI?
6. Discuss each type of Computer Assisted Instruction.

## 2.7 Suggested Reading

Ellington, Henry, Fred Percival and Philip Race. *Handbook of Educational Technology*. London: Kogan Page.

K. Barlo, David. *The Process of Communication: An Introduction to Theory and Practice.* California: Holt, Rinehart and Winston.

Joyce Bruce R., Marsha Weil. *Models of Teaching*. New York: Pearson.

Das, B.C. *Educational Technology*. New Delhi : Kalyani Publishers, 1999.

Das, R.C. *Educational Technology*, New Delhi : Sterling Publishers, 1993.

Sharma, R.A. *Technology of Teaching*: International publishing House, Meerut.

## 2.8 Model Answers to 'Check Your Progress'

**Check Your Progress-1**

1. According to Bhatt and Sharma, 'Computer Assisted Instruction is an interaction between a student, a computer controlled display, and a response entry device for the purpose of achieving educational outcomes'.
2. Suppes, Kemeny, Kurtz and Bitzer were among the first to use CAI as part of the learning process.
3. The salient features of Computer Assisted Instructions are as follows:
   - CAI is an interesting innovation in education technology, which has revolutionized the whole spectrum of education. It can cater to individual needs of many students at a time and record all the responses of students with reliability.

- CAI provides an opportunity for systematically organized maximum learning for all learners.
- CAI is a method of interaction between a computer device and a learner, for helping the learner to get information at his own pace and to achieve the desired instructional objectives.

**Check Your Progress-2**

1. This type of CAI helps in teaching specific problem-solving skills and strategies to the learner. It helps students develop skills in logic, solve problems and follow directions, and is generally used to augment higher order thinking skills. This type of instruction focuses on finding the answer. Here, learners do their own programming and the ultimate feedback is a solution of their problem. Problem-solving techniques can be used by presenting multiple choices to participants, asking them to solve the problem, and providing feedback about their choices.
2. The three advantages of CAI are:
   - Higher achievements: The use of CAI is supplementary to conventional instruction as it renders higher levels of achievement than use of traditional instruction alone.
   - Fast learning: Students learn faster with CAI than traditional instruction alone. It is easy to remember things which are shown to pupils with the help of CAI, as it is more interesting for them and increases their retaining power.
   - Positive attitude: The use of CAI leads to more positive attitude towards subject material, quality of instruction, schools in general and self as learner. This positive attitude results in better learning.
3. Some of the limitations of Computer Assisted Instruction are as follows:
   - It will harm the equity of education and increase educational costs. Low budget schools and low-income students usually cannot afford a computer. Therefore, for poor schools and students it will create unfair educational conditions. On the other hand, expensive hardware and software also becomes a big obligation for schools.
   - Basic technological knowledge is necessary for both teachers and learners to use this technique. No student can benefit from the computer if he does not know how to use it.
   - Computers cannot handle unexpected situations. Due to the limitations of a computer's artificial intelligence, computer technology is unable to deal with unexpected learning problems and respond to learners' questions immediately as teachers do.

COURSE: **EDUCATIONAL TECHNOLOGY (M.A. in Education)**

BLOCK IV: PROGRAMMED INSTRUCTION

Unit: III: **Emerging trends in Educational Technology**

# TELECONFERENCING, VIDEODISC, VIDEOTEXT, EDUSAT

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# UNIT: IV: EMERGING TRENDS IN EDUCATIONAL TECHNOLOGY

**Unit Structure:**


1.0. Objectives
1.1. Introduction
1.2. Concept of Teleconferencing
1.3. Basic features of Teleconferencing
1.4. Types of Teleconferencing.
1.4.1. Audio conferencing
1.4.2. Video conferencing
1.5. Advantages of Teleconferencing
1.6. Disadvantages of Teleconferencing
*Check Your Progress-1*
1.7. Concept of Videodisc
1.8. A brief history of Videodisc
1.9 Basic features of Videodisc
1.10. Classification and functions of Videodisc
1.11. Educational implications of Videodiscs
*Check Your Progress-2*
1.12. Concept of Videotext
1.13. Basic features of Videotext
1.14. Advantages and Disadvantages of Videotext
*Check Your Progress-3*
1.15. Concept of EDUSAT
1.16. Background of EDUSAT
1.17. Objectives of EDUSAT
1.18. Basic features and components of EDUSAT
1.19. Functions of EDUSAT
1.20. Importance of EDUSAT
*Check Your Progress-4*
1.21. Let us sum up
1.22. Key Words
1.23. Suggested readings
Possible answers to CYP
References
Model questions

**1.0.Objectives**

After going through this unit, you will be able to-

a. Explain the meaning of Teleconferencing, Videodisc, Videotext and EDUSAT
b. analyze the educational implications of Teleconferencing, Videodisc, Videotext and EDUSAT
c. Illustrate the advantages and disadvantages of Teleconferencing, Videodisc, Videotext and EDUSAT.

**1.1. Introduction**

This block reflects some emerging trends which have been developed in the recent past in the field of Educational Technology. Those have significance in the field teaching learning process too. Accordingly this block has included some emerging trends in educational technology like, teleconferencing, videodisc, videotext**,** EDUSAT etc. These are some momentous innovation of technology through which teaching learning process can be made more effective and successful. You have already acquainted with the meaning and nature about some of the device of technology with their educational implications. Now, almost all the countries of the world have developed a tendency to use these skills and equipments of technology in the field of education. It is expected that a systematic analysis of the emerging trends in educational technology will provide you an innovative idea and new perspective in thinking.

**1.2. Concept of Teleconferencing**

. A conference is a meeting. Simply teleconferencing means the use of telephones and video equipments to have a meeting with people who are in different places. It indicates the holding of a conference among people remote from one another by means of telecommunication devices (such as telephones or computer terminals).

A teleconference is a telephone meeting among two or more participants involving technology of more sophisticated than a simple two-way phone connection. At its simplest, a teleconference can be an audio conference with one or both ends of the conference sharing a speaker phone. With considerably more equipment and special arrangements, a teleconference can be a conference, called a videoconference, in which the participants can see still or motion video images of each other. Because of the high bandwidth of video and the opportunity for larger and multiple display screens, a videoconference requires special telecommunication arrangements and a special room at each end. As equipment and high-bandwidth cabling become more commonplace, it's possible that videoconferences can be held from ones' own computer or even in a mobile setting. Today's audio teleconferences are sometimes arranged over dial-up phone lines using bridging services that provide the necessary equipment for the call.

**1.3. Basic features of Teleconferencing-**

1. It is a way of conference held among people in different locations by means of a telecommunications network

2. A teleconference is a telephone meeting among two or more participants involving technology more sophisticated than a simple two-way phone connection.

3. The mode of teleconferencing can be both audio and audio-video.

4. It allows multiple parties to connect using devices such as phones or computers.

5. This conference connects those people who are in different locations that are made possible by use of telecommunications equipments.

**1.4. Types of Teleconferencing**

There have mainly two types of teleconferencing, namely Audio conferencing and Video conferencing. Let us have a discussion on those two-

**1.4.1. Audio conferencing**:

Audio conferencing usually refers to meetings held by people in different places using devices that allow sounds to be sent and received. These meetings may only involve two parties but in many cases, there are numerous parties involved. Audio conferencing can also be conducted by using a computer and the Internet. If a person is only listening, he will only need speakers. If he plans to speak, he will need a microphone as well.

Audio conferencing allows multiple parties to connect using devices such as phones or computers. This can be a solution for a number of problems that can arise when multiple parties need to meet. People,

who are distant and busy, need not to sacrifice the travel time since the meeting can be conducted from a nearby phone or computer. A person who would otherwise be excluded due to a bedridden illness can also participate. Money that would be needed to book a meeting facility or host a lunch meeting can be saved.

There are numerous methods and technologies that support audio conferencing. Many telephone companies offer the capability of three-way calling. This allows a person to call two other people on separate lines and join them together to form a group. Each person in the group who has three-way calling has the ability to expand the meeting by adding two more people.

In the field of education, by the use of audio conferencing the students can discuss about different subject matter which they want. It can be conducted by using a computer and the Internet. In Education system Audio conferencing is generally used to organize discussion or meetings of students and teacher in different places by using devices that allow sounds to be sent and received. These educational discussions may only involve two parties (a teacher and student), but in many cases, there are numerous parties involved (teacher and a group of students or within a group of students with or without teacher). Before conducting Audio conferencing related to academic matters some precautions should be taken as follows-

1) Sufficient internet service.
2) Sound to be sent and received should be clear and precise.
3) The content of discussion should be determined before conferencing.
4) Sender and receiver should actively participate.
5) Adequate electrification during conversation.
6) An electrical/ technical device (computer, mobile with adequate facilities) for conferencing.

**1.4.2. Video conferencing:**

Video conferencing is teleconferencing between groups that can both see and hear to each other. The most commonly observable example of video conferencing are in television news broadcasts where studio anchors talk simultaneously to multiple reporters on the field during elections and during international cricket matches where commentators, studio experts and on-field hosts interact in live on television. The basic Components of a Complete Video Conferencing System are as follows-

1) Camera
2) Video Display
3) Video Conferencing Codec Unit
4) Microphone/Audio Sub-System
5) Other Equipment like PC
6) Surges suppressor,
7) DVR, switcher etc.

Like audio conferencing in context of video conferencing also some precautions should be taken before conducting the conferencing. Those are -

1. Sufficient internet service.
2. Sound to be sent and receive should be clear and precise.
3. The content of discussion should be determined before conferencing.
4. Sender and receiver should actively participate.
5. Adequate electrification during conversation.
6. Arrange an electrical/ technical device (computer, mobile with adequate facilities) for conferencing.

In the field of teaching learning process, teleconferencing is an innovative idea. Through teleconferencing one student or a group of student can exchange their opinion at the same time from different places in a looking mode (in the screen of monitor) or audio mode. The learners can discuss their academic problem spontaneously. Application of this system in education can give an international standard to education but still now it is limited only an intellectual group of people. In period of globalization in education, teleconferencing is a futuristic model. The learner can also record the meeting/conference. They are able to do anything that they can expect from a traditional meeting. In fact, they get better facilities. They just need to attend the conference through their Smartphone or desktop. They do not need to go through the hassle of the travel and accommodation. The learners can arrange the

conference within a minimum possible time to get an instant solution for any critical condition or academic problem.

**1.5. Advantages of Teleconferencing**

**1. Cost-effective**: Teleconferencing is considered as a cost-effective solution for the students and teachers. If we follow the traditional discussion, we need to spend on the traveling. We will also need an accommodation if we have to attend a conferencing in a distant location. However, in the teleconferencing, we do not need to spend on the travel and accommodation. The learners can join the conferencing from their own locations and can discuss all the important matters without any hassle.

**2. Reduce travel**: One of the benefits of teleconferencing is that with the teleconferencing, we do not need to travel for hours for our physical presence. Instead, we can join and host meetings/conferencing/discussion online from the comfort of our place. We can attend a conferencing from our home, office, and from any convenient place. Besides, we can share documents, images and texts too. We can also record the meeting/conferencing. We will be able to do anything that we can expect from a traditional meeting. In fact, we can get better facilities.

**3. Less-time consuming**: Another benefit of teleconferencing is that as all the learners can attend the conferencing from their locations, one can schedule online meetings any time with a short notice. They just need to attend the meeting through their Smartphone or desktop. They do not need to go through the hassle of the travel and accommodation.

4. **Instant solution**: Now, we do not need many arrangements to start the meetings. In the teleconferencing, we do not need the physical presence as well. We can arrange the meeting within a minimum possible time to get an instant solution for any critical condition.

**5. Enhance productivity**: It increases the productivity of education system with the improved performance. All the learners of academic side from the different locations can come together to discuss the academic problems and to get a solution in the real time that will contribute to the success of the teaching learning process,

**6. Larger audience:** Another benefit is that there will be no restriction of the participants as we do not need the physical presence of the participants. If we choose developed software, we can start a conferencing with the thousands of attendees/students.

**7. Flexible:** Teleconferencing is considered very flexible. We can join it from anywhere with an Internet connection. We can even share the documents and files important for the success of the conferencing.

**8. Secure:** The teleconferencing is also considered safe and secure. If we choose any developed software, all the privacy will be protected with the right security system. No one will be able to get the details except the host. But for the best security, we will have to choose the right teleconferencing tool.

**9. Recording**: One of the best benefits of teleconferencing is that we can record a part and the entire conference and can play it later wherever required. The learners can also share the same.

**10. Communicative:** During the teleconferences, the learners are able to see the expressions and body languages of the participants that will help to have a more effective collaboration. We can communicate with our teaching staffs whenever required and can discuss both the major and minor issues of education. The collaborations become easier and more effective as we can start it within a minimum time to increase the productivity of the education system.

Teleconferencing can help us in many ways to increase the productivity of our education system and to make education comprehensive. It also creates a reliable environment by developing academic communication among the teaching staff or student .society. If we are running a course and want to make the communication system more effective, we can consider the using of the teleconferencing. It will help to get the right solution in the real time. Some teleconferences require each attendee to call into a central number and use a code to enter the discussion, while others are initiated by a conferencing organizer who calls the parties from her phone. Knowledge of organize and manage teleconferencing can make us more valuable in our teaching learning process.

**1.6. Disadvantages of Teleconferencing**

**1. Lack of Body Language**: Teleconferencing doesn't let us read other participants' body language, which can give us clues as to whether we need to change the direction during a conferencing. For

example, if the person is meeting with crosses his arms, it might be a sign of defensiveness and that we are not connecting. Seeing this, we would be able to soften our message. Someone slouching or tapping their fingers can signal they are losing interest, letting us know to change the subject or finish our point. In a teleconferencing situation, we do not get these cues to make changes in our presentation.

**2. Lack of Eye Contact:** Eye contact is another key benefit we lose when teleconferencing. Someone who looks down at the floor might be lying, giving us a clue not to take him at his word if we are interviewing him how much receiver have understood or involved in the call. If someone's eyes dart around the room, they might be bored. If our conferencing partners absolutely can't make an in-person meeting, ask about videoconferencing capabilities. Using the video cameras on our computers and the availability of low-cost and free video services such as Skype, it might be just as easy to organize a video meeting.

**3. Interruptions:** People who teleconference do so generally by using landlines, cell phones and voiceover Internet protocol or VOIP, phones then Plan should be taken on interruptions during telephone meetings when calls are dropped and Internet connections go dead. Many people attend teleconferences while driving, talking on cell phones that can create static or other noise as the user moves in and out of dead zones. Some people take advantage of teleconferences to stay at home that day, leading to crying babies, barking dogs or people at the door disrupting our call.

**4. No Visual Presentation**: The ability to share graphs, charts, photos, reports, drawings, videos, product samples and other visual messages is important whether we're trying to get information from the teacher or to understand a new content that we are discussing. When organizing or attending a teleconference that would benefit from visuals, upload documents or videos to a company or personal website or email information to attendees before the meeting starts. But some time lake of proper visual presentation, this procedure become insufficient.

***Check Your Progress-1***

**1**. What is Teleconferencing? What are basic features of Teleconferencing?

2. What is audio and video conferencing? Discuss about their importance in education.

3. Elaborate the advantage and disadvantage of audio and video conferencing.

### 1.7.Concept of Videodisc

Videodisc (or video disc) is a general term for a laser or stylus-readable random-access disc that contains both audio and video signals recorded in an analog form. Typically, it is a reference to any such media that predates the mainstream popularity of the DVD format. Initially it was used as a device for keeping movie and other special document of personal and official use. Gradually it is used as a record keeper of academic document in both audio and video format.

The most promising format for educational application is the reflective optical laser videodisc. These discs resemble to shiny, silver audio records. These are prepared from a master video tape transferred to disc through mastering which imprints the disc with microscopic pits to be read by a laser beam during disc play. Slides, film, video and print can all be transferred to videodisc. A standard size videodisc can hold up to 30 minutes of high quality, motion video or up to 54,000 still frames on each side. Modulation of the laser beam allows rapid, random access to any single frame on a disc side without wear on the disc surface. Additional features include dual audio tracks or stereo sound, variable-speed motion and single frame advance in forward or reverse modes and the capacity for branching to specific frames or segments in response to viewers input.

Videodisc is a new technology. Few commercial educational videodiscs are now available in market. The situation is improving with electronic publication attracting increased interest from instructional material producers. The videodiscs have been primarily the product of research and development projects although some of these are available for purchase too. Several projects are experimenting with the principles of interactive video by creating interactive videotape programs.

Videodisc allows the creation of interactive video programming. Traditional video programs play linearly in a pre-planned beginning to end sequence. With the videodisc learners, instructors and lesson designers can have opportunity for input and control over the sequence of the program. The sequence is dynamic and changing in response to overall objectives as well as the style and level of instruction.

Some institutions like Minnesota Educational Computing Consortium (MECC), the University of Washington, the University of Iowa Wage Computing Center, the University of Delaware, the Massachusetts Institute of Technology, Lehigh University, Simon Fraser University, Brigham Young University and the Pennsylvania State University included their institutional content in videodisc and used to transfer teaching content through it.

Commercially available discs have covered a wide range of topics related to computer literacy and new electronic technologies, astronomy and space exploration, social studies, biology, music and physics. Major educational publishers are moving into the field. For example- Harcourt Brace Jovanovich, Inc., is developing a program for K-12 to accompany a text book series.

1.8. A brief history of Videodisc

Videodisc has a long history. After passing different step it is able to play an important role in the field of education also. For the first time a French inventor, chronophotographic, filmmaker, and gymnast Georges Demeny on 3 March, 1892 patented a phonoscope designed in 1891 that projected chronophotographic pictures on a glass disc. Following it Eadweard Muybridge who was as an English photographer important for his pioneering work in photographic studies of motion, and early work in motion-picture used his zoopraxiscope to project chronophotographic pictures on a glass disc in 1893.

In New York, at 1898 E & H T Anthony, a camera maker a combination motion picture camera and projector called "The Spiral" that could capture 200 images arranged in a spiral on an 8 inch diameter glass plate. When played back at 16 frames per second, it would give a running time of 13 seconds.

In 1907 Theodore Brown who is Professor Emeritus of Chemistry at the University of Illinois at Urbana Champaign, and Founding Director Emeritus of the Arnold and Mabel Beckman Institute, patented a photographic disk system of recording approximately 1,200 images in a spiral of pictures on a 10 inch disk. Played back at 16 frames per second, the disk could provide around one and a quarter minutes of material. The system was marketed as the urban spirograph by Charles Urban who was the most significant figure in the early British film industry and discs were produced - but it soon disappeared.

John Logie Baird who was a Scottish engineer, innovator, one of the inventors of the mechanical television, demonstrating the first working television system, created the Phonovision system in the early 1930s which mechanically produced about four frames per second. The system was not successful.

A French inventor P.M.G Toulon working at Westinghouse Electric during the 1950s and 1960s patented a system in 1952 which used a slow spinning disc with a spiral track of photographically 1.5 millimeter wide recorded frames along with a flying spot scanner which swept over them to produce a video image. This was intended to be synchronously combined with playback from a vinyl record. It appears a working system was never produced. It has similarities with the tape based Electronic Video Recording system which was released only for professional use.

After fifteen ears Westinghouse Electric Corporation who Provides Smart Home Appliances to Energy Solutions that are cleanly and safely powering us into the next generation .developed a system in 1965 called Phonovid that allowed for the playback of 400 stored still images along with 40 minutes of sound. The system used a standard record player and built the picture up slowly.

The Television Electronic Disc, a mechanical system was rolled out in Germany and Austria in 1970 by Telefunken. Here, 12-inch discs had a capacity of about eight minutes; however, it was abandoned in favor of VHS by its parent company.

In Japan also the TOSBAC computer was using digital video disks to display color pictures at 256x256 image resolution in 1972. In 1973, Hitachi announced a video disc capable of recording 15-colour still images on a disc. The same year, Sony announced a video disc recorder, similar to the Sony Mavica format.

In 1975, Hitachi introduced a video disc system in which chrominance; luminance and sound information were encoded holographic ally. Each frame was recorded as a 1 mm diameter hologram on a 305 mm disc, while a laser beam read out the hologram from three angles. It had a capacity of 54,000 frames with a running time of 30 minutes for the NTSC color standard or 36 minutes for PAL/SECAM.

Visc was a mechanical video disc system developed in Japan by Matsushita subsidiary National Panasonic in 1978. The 12-inch vinyl disc was spun at 500 rpm with each revolution holding three frames of color video with a total of up to an hour of video on each side of the disc. Discs could be recorded in

either a 30-minute-per-side format or a 60-minute-per-side-format. A later incarnation of the system used 9-inch discs in caddies capable of storing 75 minutes per side. The system was abandoned in January, 1980 in favor of JVC's VHD system.

The Disco Vision system was released in America in 1978. Developed by MCA and Philips of the Netherlands, it utilized an optical reflective system read by a laser beam. It was renamed several times, as VLP, Laser vision and CD Video. Finally, Japan's Pioneer Electronic Corporation trademarked it as Laserdisc, the name by which it is best known. The format struggled to gain wide acceptance in the consumer market and Pioneer became the chief sponsor of the format when MCA and later Philips, withdrew their support for it. The high cost of both players and discs was the main reason for its ultimate demise.

Thomson CSF created a system that used thin flexible videodiscs which used a transmissive laser system with light source and pickup on opposite sides of the disc. The system was marketed for industrial and educational use in 1980. Each side of the disc could hold 50,000 still CAV frames, and both sides could be read without removing the disc. Thomson exited the videodisc market in 1981.

RCA produced a system called CED under the brand SelectaVision in 1981. The system used a physical pickup riding in grooves of a pressed disc, reading variance in capacitance in the underlying disc. The system competed with Laserdisc for a few years before being abandoned.

JVC produced a system very similar to CED called Video High Density (VHD). It was launched in 1983 and marketed predominantly in Japan. It was a capacitance contact system but without grooves. VHD discs were adopted in the UK by Thorn EMI which started to develop a consumer catalogue including bespoke material. Development for the mass market was halted in late 1983 but the system remained on sale for educational and business markets as a computer-controlled video system until the late 1980s with very little success.

Laser film, a videodisc format developed by McDonnell Douglas was released in 1948. Although research is still limited, early findings indicate that interactive videodisc instruction, which is thoughtfully and systematically developed, and shows creative new instructional strategies, is beginning to demonstrate consistent positive results. Studies have found that students learn more efficiently and enjoy learning more than with traditional approaches.

Movie CD, by SIRIUS Publishing, Inc. (1995) was a format that used a traditional CD-ROM disc for playback on a Windows PC containing a video file of a movie encoded in a proprietary codec developed by the publisher with the disc also containing codec and playback software for the movie. The quality was somewhat low due to the compression the Motion Pixels codec used, resulting in a playback resolution of only 320x236 at 16 frames per second, using 16-bit high color.

DVD (Digital Video Disc or Digital Versatile Disc) was released in 1996. It is a hybrid of Philips and Sony's MM-CD (Multi-Media Compact Disc) format and Toshiba’s SD (Super Density) format. The last-minute adoption of the hybrid DVD format was agreed to by all three companies in an effort to avoid a damaging format war similar to that between Beta and VHS in the 1970s and 1980s. Toshiba failed to reach a similar compromise agreement with Sony in the race to develop a high-definition optical video disc format in the 2000s. This proved to be a costly mistake for Toshiba and the AOD (Advanced Optical Disc) format, later renamed HD DVD, lost a brutal format war with Sony's Blu-ray Disc (BD) format. This format war delayed acceptance of either format and Blu-ray Disc has only recently gained traction in the consumer market where it competes with the continued success of DVD and the rise of streaming movie services such as Netflix. The pioneering Nebraska Videodisc Design/Production Group has produced videodiscs on many topics including whales, metrics, basic tumbling, Spanish pronunciation and decision-making for the hearing/impaired and has shared information through workshops, seminars and publications. Utah State University has been actively involved with disc technology, producing discs for special education and other applications. The federally-funded Videodisc Interactive Microcomputer (VIM) Institute enabled elementary schools and other educational institutions to experiment with videodiscs in the classroom.

**1.9. Basic features of videodisc**

1. Videodisc contains both audio and video signals recorded in an analog form.
2. Videodisc allows the creation of interactive video programming.

3. Initially it was used as a device for keeping movie and other special document of personal official use.

4. Videodisc is a reference to any such media that predates the mainstream popularity of the DVD format.

5. In videodisc different kinds of documents or videos can be kept for a long period of time.

6. The content of the disc is shown in menu form with chapters and sub-chapters arranged in decimal order.

**1.10. Classification and functions of Videodisc**

**Classification:** Video discs can be classified based on their playback mechanism which is given below.

1. Mechanical.
2. Phonovision
3. Phonovid; - a. Ted. b.Visc
4. Capacitance Based- a. CED b. VHD
5. Optical discs
6. Reflective: - a) Laserdisc b) CD, DVD, c). Blue-ray, etc
7. Tran missive: - a) Thomson system. b) Laser film

**Functions of Videodisc**

1. Storing of films, still pictures and academic data.
2. It works as a databank without any logical or didactic link.
3. It can assemble different kinds of academic information.
4. Films and other corresponding data to be given to the learners can be recorded on disc
5. In elementary schools and other educational institutions to experiment or explain some confusing content videodiscs acts through active role in the classroom.

**1.11. Educational implications of videodiscs**

Videodisc has many educational utilities. In addition to being useful in traditional Computer Assisted Instruction (CAI) formats, videodisc technology is used widely in the field of teaching-learning. Some of such educational implications are-

1. Videodisc can facilitate to learn costly or risky procedures such as physics/chemistry experiments, operation of mechanical equipment, psychological experiments etc.

2. Videodisc can facilitate human interactions to provide realistic practice in interpersonal situations such as teachers and students teachers and parents n a meaningful manner.

3. Teaching standardized procedures for example first aid training etc. can be made available through Videodisc.

4. It enables storing of audiovisual databases such as collections of still photographs or illustrations for educational purposes.

5. It helps in art education, health education and technical training by showing visual details, reviewing and comparing visual material.

6. Videodisc helps the learner in self learning.

7. Videodisc can contain educational projects also.

8. Compact storage of films and still pictures for educational purposes is possible through Videodisc.

9. Different chapters and sub-chapters can be arranged systematically which may help the learner in perceiving the contents easily.

***Check Your Progress-2***

1. What is Videodisc? Mention the basic features of Video disc.

2. Discuss the educational implications of Videodisc.

**1.12. Concept of Videotext**

Videotext an electronic data-retrieval system in which usually textual information was transmitted via telephone or cable television lines and displayed on a television set or video display terminal. Videotext involves the transmission of display text, graphics and their reception on a television set. Simply it is a system that provides interactive content and displays on a video monitor such as a television,

typically using modems to send data in both directions. Videotext is of two types- (i) Broadcast videotext (Telecast) and (ii) Interactive videotext (view data). Both are used for educational purposes. In telecast type, the user can select information only from the limited amount being transmitted. In view data type, a user can get access to thousands of pages information stored in several computers.

Videotext was originally designed in the early 1970s. It was an information-delivery system for the home and one of the earliest incarnations of an end-user information system. Typically, videotext systems were menu-driven systems designed for display on television sets. Videotext information included news, weather, local information and services such as bus schedules and entertainment event listings. Many large media firms implemented videotext systems in the United States and several countries such as England, Canada, and France invested large amounts of money in this technology. However, with the exception of the Minitel system in France, videotext systems were largely defunct by the late 1990s. In the mid-1980s, several media firms in the United States invested large amounts of money into developing videotext systems, though all were unsuccessful. Other countries used government money to develop videotext systems. In 1979, the British Post Office developed Pestle, which foundered for years with low numbers of users.

Minitel, developed by France Telecom in the early 1980s, was one of the few successful videotext systems. Although it was originally created to provide an online telephone directory, Minitel became popular in large part owing to its messageries or chat services, especially the sexually explicit adult chat lines. In 1998 Minitel was more popular in France than the Internet with over 14 million users. The service persisted until its retirement in 2012.

**1.13. Basic features of Videotext**

Videotext is a two-way interactive service. It has the following features-

**1)** It is electronic data-retrieval system in which usually textual information is transmitted via telephone or cable television lines and displayed on a television set or video display terminal.

**2)** Videotext information included news, weather, local information, and services such as bus schedules and entertainment event listings.

**3)** As cable-television systems, it allows the subscribers with home computers to link up with computer networks, giving the subscribers access to data banks and permitting them to interact with other online users.

**4)** Videotext involves the transmission of display text, graphics and their reception on a television set.

In teaching learning process videotext plays an important role. Through videotext various course materials can be sent to the learner. It is most helpful for those learners who take education through distance mode. Because it can disseminate information or academic material to the learners very easily.

**1.14 Advantages and disadvantages of Videotext**

**Advantages**

1. Videotext is a very useful in distance education for disseminating information regarding courses and programmes available.
2. Through Videotext, a user can get access to thousands of pages of information stored in several computers

**Disadvantages**

1. With the exception of Minitel, the failure of videotext systems can be attributed to their technical limitations and to their lack of varied social uses.

2. Many customers/learners are deterred by awkward interfaces and poor interactivity.

3. The decoder boxes are notoriously difficult to use and the interactivity become problematic.

4. Delivery by telephone line meant that customers' lines are tied up for the duration of each use. Videotext operators found it difficult to attract customers and advertisers are also not interested.

***Check Your Progress-3***

1. What is Videotext? Mention basic features of videotext.
2. Write about the advantages and disadvantages of Videotext.

**1.15. Concept of EDUSAT**

EDUSAT is a best innovation in the field of Educational Technology. It is a satellite project through which teaching-learning process can be done more effectively. A large number of people can be covered to provide education through the EDSAT.

Educational Satellite (EDUSAT) is a communications satellite launched by the Indian Space Research Organization (ISRO). EDUSAT is the first dedicated Educational Satellite that provides the country with satellite based two way communications to class room for delivering educational materials. On September 20, 2004, EDUSAT was launched into space by India. It was equipped with KU-band and extended C-band transponders, each providing 6-7 national beams and 5 regional beams. GSAT-3, known as EDUSAT is meant for distant class room education from school level to higher education. Dr. APJ Abdul Kalam, the president of India said, "Democratization of knowledge indicates, knowledge for everyone, anytime, anyplace. EDUSAT will be extremely useful in making the shift possible and decreasing the digital divides."

**1.16. Background of EDUSAT**

The history of harnessing a space satellite to widen the geographical and demographical coverage of education in India goes back to Satellite Instructional Television Experiment (SITE) in 1971. SITE was used in some areas of India systematically at 1975-76. This experiment was successfully applied by American Application Technology (ATS-16) among 2,400 villages out of 6 states of India. At the initial stage SITE telecasted some programme like Health & Hygiene, information about family planning schemes etc. The Ministry of Human Resource Development supported the Satellite Instructional Television Experiment during that period. It subsequently set up the central and state institutes of Educational Technologies to use satellite television for primary education. The UGC through its consortium of Educational Commission of EMRC-AVRCs, actively utilizes satellite broadcasting for Higher Education. The IGNOU too now uses satellite broadcasting, leading to the operationalization of the Gyan Darshan and Giovanni channels. At 1983, inaugurating INSAT, various educational programmes were delivered. After it, a new project "Jhabua Development Commission project" (JDPC) was launched. In its later period, by establishing Training and Development Communication Channel (TDCC) Tele- education was started. The success of INSAT centric education inspired to open another Satellite for expansion of education. Indian Space Research Organization (ISRO) and Indira Gandhi National Open University (IGNOU) collaborated in the use of satellite communication for enriching learning processes and experiences. Under the ISRO-IGNOU joint venture (2002), four TV channels and two interactive networks dedicated to education were started. These successful joint interventions led ISRO to design, develop and launch a satellite especially for educational purposes.

A document titled "*Educating the nation: Need for a dedicated satellite*" published by NIEPA in July 2003 provided a brief details about the project of EDUSAT. In his foreword to the document, B. S. Bhatia, Director, Development and Educational Communication Unit (DECU) has observed, "The educational institutions of the country have continuously endeavored to use the latest technology to support the process of education".

Prof. Marmer Mukhopadhyay, Director and Chairman of Educational Technology and Management Academy (ETMA), who was closely associated with the project, has given a very interesting and vivid account of EDUSAT's history in 2006. In his words "EDUSAT is the culmination of years of micro and meso-level experiments in satellite delivered interactive learning".

**1.17. Objectives of EDUSAT**

1. To provide education at low cost.
2. To provide education to the people each and every part of India.
3. To act as instrument for providing instruction, feedback and to assist the learner.
4. To develop the qualitative and quantitative standard of teaching-learning process by the use of technology.
5. To provide opportunity for self education irrespective of place and time.

**1.18. Basic features and Components of EDUSAT**

1. It is a satellite system that can be applied broadly in the field of education.

2. It provides education through television broadcast, computer conferencing and web based instruction.
3. Teaching learning process of classroom can be made more effective by using audio visual aids under EDUSAT.
4. It coordinates the educational institutions of remote and city area.
5. It is less expensive education system.

**Components of EDUSAT** are-

1. Network configuration
2. Teaching end/point
3. Receiving point at classroom

### 1.19. Functions of EDUSAT

**1) Conventional Radio and television broadcasting**

There have lots of educational Radio and Television programmes in India which are conducted by CIET, SIET, IGNOU, NIOS, and IIT etc. Through FM Radio, All India Radio, DD- I (National T.V channel), the educational programmes are provided through out the country in a fixed date and time. It covers school, college, and other higher educational institutions in order to provide qualitative education.

**2) Interactive Radio and Television**

EDUSAT connects between student and teacher through its Radio and Television programme in distance mode instead of classroom communication. In context of distance education both teacher and student can interact through telephone or television screen. Likewise during the telecast period through Radio and TV, the students can ask or reply the questions. Hence, the interactive Radio and Television programmes inspire the learner to acquire new knowledge.

**3) Exchange of data/information**

EDUSAT provide various information, news, file through computer network. The learners and teachers can get benefit through exchanging data with their own ID.

### 1.20. Importance of EDUSAT

1. Geographically backward people can be provided education within a short period.
2. It can change the traditional education system by the use of audio visual aids which make education more realistic.
3. It is a less expensive education system.
4. It helps to expand education in different parts of India.
5. EDUSAT is very useful in distance education for disseminating information regarding courses and programmes available.
6. It provides Internet-supported interactive learning.
7. It has the provision of digital storage and retrieval of educational software at convenience.
8. It creates an environment of virtual classrooms through computer conferencing, real-time as well as asynchronous.

***Check Your Progress-4***

1. What is EDUSAT? Mention the basic features and components of EDUSAT.
2. Write briefly about the functions of EDUSAT.
3. Discuss about the importance of EDUSAT.

### 1.21. Let us sum up

Some emerging trends which have been developed in the recent past in the field of Educational Technology have significant contribution in the field teaching learning process. Teleconferencing, Videodisc, Videotext**,** EDUSAT etc are some of such momentous innovation of technology through which teaching learning process can be made more effective and successful. Teleconferencing, EDUSAT, Videotext, Videodisc, are the emerging trends in education which adversely impact in teaching learning process. In the field of education, by the use of conferencing the students can discuss about different subject matter which they want. It can be conducted by using a computer and the Internet. In Education system conferencing is generally used to organize discussion or meetings of students and teacher in different places by using devices that allow sounds to be sent and received. These educational discussions may only involve two parties (a teacher and student), but in many cases, there are numerous parties

involved (teacher and a group of students or within a group of students with or without teacher). EDUSAT is a best innovation in the field of Educational Technology. It is a satellite project through which teaching-learning process can be done more effectively. A large number of people can be covered to provide education through the EDSAT. Videotext **i**nvolves the transmission of display text, graphics and their reception on a television set.

In teaching learning process videotext plays an important role. Through videotext various course materials can be sent to the learner. It is most helpful for those learners who take education through distance mode. Because it can disseminate information or academic material to the learners very easily. Videodisc is a new technology. Few commercial educational videodiscs are now available in market. The situation is improving with electronic publication attracting increased interest from instructional material producers. The videodiscs have been primarily the product of research and development projects although some of these are available for purchase too. Several projects are experimenting with the principles of interactive video by creating interactive videotape programs.

**1.8. Key Words**

**Conferencing**: A meeting of various committees to settle disagreements between the two branches of the legislature.

**Conventional radio**: It is of utmost importance to pick the best two way radios for "yourself and your team

**Phonovision**; Phonovision is a proof of concept format and experiment for recording a mechanical television signal on gramophone records.

**A text display:** A text display is an electronic alphanumeric display device that is mainly or only capable of showing text, or extremely limited graphic characters

**Interactive video:** An interactive video might connect the user to an external website. A shoppable video, for example, might demonstrate a product and include hot links to take users to the vendor's website to learn more or make a purchase.

**1.9. Suggested readings**

1. Agarwal J.C. (2001). *Essentials of Educational Technology ,innovation in teaching –Learning* . Noida:. Vikash publishing house.

2. Mangal Dr SK (2001) *Foundations of Educational Technology* Tandon publication:.Ludhiana

**Possible answers to CYP-1**

1. A teleconference is a telephone meeting among two or more participants involving technology of more sophisticated than a simple two-way phone connection. At its simplest, a teleconference can be an audio conference with one or both ends of the conference sharing a speaker phone**.**

**Basic features of Teleconferencing-**

1. It is a way of conference held among people in different locations by means of a telecommunications network

2. A teleconference is a telephone meeting among two or more participants involving technology more sophisticated than a simple two-way phone connection.

3. The mode of teleconferencing can be both audio and audio-video.

4. It allows multiple parties to connect using devices such as phones or computers.

5. This conference connects those people who are in different locations that are made possible by use of telecommunications equipments.

2. **Audio** conferencing usually refers to meetings held by people in different places using devices that allow sounds to be sent and received. These meetings may only involve two parties but in many cases, there are numerous parties involved. Audio conferencing can also be conducted by using a computer and the Internet. If a person is only listening, he will only need speakers. If he plans to speak, he will need a microphone as well.

   **Video** conferencing is teleconferencing between groups that can both see and hear to each other. The most commonly observable example of video conferencing are in television news broadcasts where studio anchors talk simultaneously to multiple reporters on the field during elections and

during international cricket matches where commentators, studio experts and on-field hosts interact in live on television.

In the field of teaching learning process, teleconferencing is an innovative idea. Through teleconferencing one student or a group of student can exchange their opinion at the same time from different places in a looking mode (in the screen of monitor) or audio mode. The learners can discuss their academic problem spontaneously. Application of this system in education can give an international standard to education but still now it is limited only an intellectual group of people. In period of globalization in education, teleconferencing is a futuristic model. The learner can also record the meeting/conference. They are able to do anything that they can expect from a traditional meeting. In fact, they get better facilities. They just need to attend the conference through their Smartphone or desktop. They do not need to go through the hassle of the travel and accommodation. The learners can arrange the conference within a minimum possible time to get an instant solution for any critical condition or academic problem.

**Advantages of Teleconferencing**

**1. Cost-effective**: Teleconferencing is considered as a cost-effective solution for the students and teachers. If we follow the traditional discussion, we need to spend on the traveling. We will also need an accommodation if we have to attend a conferencing in a distant location. However, in the teleconferencing, we do not need to spend on the travel and accommodation. The learners can join the conferencing from their own locations and can discuss all the important matters without any hassle.

**2. Reduce travel**: One of the benefits of teleconferencing is that with the teleconferencing, we do not need to travel for hours for our physical presence. Instead, we can join and host meetings/conferencing/discussion online from the comfort of our place. We can attend a conferencing from our home, office, and from any convenient place. Besides, we can share documents, images and texts too. We can also record the meeting/conferencing. We will be able to do anything that we can expect from a traditional meeting. In fact, we can get better facilities.

**3. Less-time consuming**: Another benefit of teleconferencing is that as all the learners can attend the conferencing from their locations, one can schedule online meetings any time with a short notice. They just need to attend the meeting through their Smartphone or desktop. They do not need to go through the hassle of the travel and accommodation.

4. **Instant solution**: Now, we do not need many arrangements to start the meetings. In the teleconferencing, we do not need the physical presence as well. We can arrange the meeting within a minimum possible time to get an instant solution for any critical condition.

**5. Enhance productivity**: It increases the productivity of education system with the improved performance. All the learners of academic side from the different locations can come together to discuss the academic problems and to get a solution in the real time that will contribute to the success of the teaching learning process,

**6. Larger audience:** Another benefit is that there will be no restriction of the participants as we do not need the physical presence of the participants. If we choose developed software, we can start a conferencing with the thousands of attendees/students.

**7. Flexible:** Teleconferencing is considered very flexible. We can join it from anywhere with an Internet connection. We can even share the documents and files important for the success of the conferencing.

**8. Secure:** The teleconferencing is also considered safe and secure. If we choose any developed software, all the privacy will be protected with the right security system. No one will be able to get the details except the host. But for the best security, we will have to choose the right teleconferencing tool.

**9. Recording**: One of the best benefits of teleconferencing is that we can record a part and the entire conference and can play it later wherever required. The learners can also share the same.

**10. Communicative:** During the teleconferences, the learners are able to see the expressions and body languages of the participants that will help to have a more effective collaboration. We can communicate with our teaching staffs whenever required and can discuss both the major and minor issues of education. The collaborations become easier and more effective as we can start it within a minimum time to increase the productivity of the education system.

Teleconferencing can help us in many ways to increase the productivity of our education system and to make education comprehensive. It also creates a reliable environment by developing academic communication among the teaching staff or student .society. If we are running a course and want to make the communication system more effective, we can consider the using of the teleconferencing. It will help to get the right solution in the real time. Some teleconferences require each attendee to call into a central number and use a code to enter the discussion, while others are initiated by a conferencing organizer who calls the parties from her phone. Knowledge of organize and manage teleconferencing can make us more valuable in our teaching learning process.

**1.6. Disadvantages of Teleconferencing**

**1. Lack of Body Language**: Teleconferencing doesn't let us read other participants' body language, which can give us clues as to whether we need to change the direction during a conferencing. For example, if the person is meeting with crosses his arms, it might be a sign of defensiveness and that we are not connecting. Seeing this, we would be able to soften our message. Someone slouching or tapping their fingers can signal they are losing interest, letting us know to change the subject or finish our point. In a teleconferencing situation, we do not get these cues to make changes in our presentation.

**2. Lack of Eye Contact:** Eye contact is another key benefit we lose when teleconferencing. Someone who looks down at the floor might be lying, giving us a clue not to take him at his word if we are interviewing him how much receiver have understood or involved in the call. If someone's eyes dart around the room, they might be bored. If our conferencing partners absolutely can't make an in-person meeting, ask about videoconferencing capabilities. Using the video cameras on our computers and the availability of low-cost and free video services such as Skype, it might be just as easy to organize a video meeting.

**3. Interruptions:** People who teleconference do so generally by using landlines, cell phones and voiceover Internet protocol or VOIP, phones then Plan should be taken on interruptions during telephone meetings when calls are dropped and Internet connections go dead. Many people attend teleconferences while driving, talking on cell phones that can create static or other noise as the user moves in and out of dead zones. Some people take advantage of teleconferences to stay at home that day, leading to crying babies, barking dogs or people at the door disrupting our call.

**4. No Visual Presentation**: The ability to share graphs, charts, photos, reports, drawings, videos, product samples and other visual messages is important whether we're trying to get information from the teacher or to understand a new content that we are discussing. When organizing or attending a teleconference that would benefit from visuals, upload documents or videos to a company or personal website or email information to attendees before the meeting starts. But some time lake of proper visual presentation, this procedure become insufficient

**Possible answers to CYP-2**

Videodisc (or video disc) is a general term for a laser or stylus-readable random-access disc that contains both audio and video signals recorded in an analog form. Typically, it is a reference to any such media that predates the mainstream popularity of the DVD format.

**Educational Implications of Videodisc**: - Videodisc has many educational utilities. In addition to being useful in traditional Computer Assisted Instruction (CAI) formats, videodisc technology is used widely in the field of teaching-learning. Some of such educational implications are-

1. Videodisc can facilitate to learn costly or risky procedures such as physics/chemistry experiments, operation of mechanical equipment, psychological experiments etc.

2. Videodisc can facilitate human interactions to provide realistic practice in interpersonal situations such as teachers and students teachers and parents n a meaningful manner.

3. Teaching standardized procedures for example first aid training etc. can be made available through Videodisc.

4. It enables storing of audiovisual databases such as collections of still photographs or illustrations for educational purposes.

5. It helps in art education, health education and technical training by showing visual details, reviewing and comparing visual material.

6. Videodisc helps the learner in self learning.

7. Videodisc can contain educational projects also.

8. Compact storage of films and still pictures for educational purposes is possible through Videodisc.

9. Different chapters and sub-chapters can be arranged systematically which m in the current ay help the learner in perceiving the contents easily.

***Check Your Progress-3***

1. Videotext an electronic data-retrieval system in which usually textual information was transmitted via telephone or cable television lines and displayed on a television set or video display terminal. Videotext involves the transmission of display text, graphics and their reception on a television set. Simply it is a system that provides interactive content and displays on a video monitor such as a television, typically using modems to send data in both directions. Videotext is of two types- (i) Broadcast videotext (Telecast) and (ii) Interactive videotext (view data). Both are used for educational purposes. In telecast type, the user can select information only from the limited amount being transmitted. In view data type, a user can get access to thousands of pages information stored in several computers.

Videotext has the following features-

a. It is electronic data-retrieval system in which usually textual information is transmitted via telephone or cable television lines and displayed on a television set or video display terminal.
b. Videotext information included news, weather, local information, and services such as bus schedules and entertainment event listings.
c. As cable-television systems, it allows the subscribers with home computers to link up with computer networks, giving the subscribers access to data banks and permitting them to interact with other online users.
d. Videotext involves the transmission of display text, graphics and their reception on a television set.

**2.The advantages and disadvantages of Video Texts are –**

**Advantages**

a. Videotext is a very useful in distance education for disseminating information regarding courses and programmes available.

b. Through Videotext, a user can get access to thousands of pages of information stored in several computers

**Disadvantages**

a. Videotext systems has technical limitations and lacks varied social uses.

b. Many customers/learners are deterred by awkward interfaces and poor interactivity.

c. The decoder boxes are notoriously difficult to use and the interactivity become problematic.

d. Delivery by telephone line meant that customers' lines are tied up for the duration of each use. Videotext operators found it difficult to attract customers and advertisers are also not interested.

**Possible answers to CYP-4**

EDSAT is a satellite project through which teaching-learning process can be done more effectively. A large number of people can be covered to provide education through the EDSAT.

**Basic features and Components of EDUSAT**

1. It is a satellite system that can be applied broadly in the field of Education.
2. It provides education through television broadcast, computer conferencing and web based instruction.
3. Teaching learning process of classroom can be made more effective by using audio visual aids under EDUSAT
4. It helps to correlate between the educational institutions of remote and city area.
5. It is less expensive education system.

**Components of EDUSAT** are-

1. Network configuration
2. Teaching end/point
3. Receiving point at classroom.

**Importance of EDUSAT**

1. Geographically backward people can be provided education within a short period.
2. It can change the traditional education system through the use of audio visual aids which make education more realistic.
3. It is a less expensive education system.
4. It helps to expand education in different parts of India.
5. EDUSAT is very useful in distance education for disseminating information regarding courses and programmes available.
6. It provides Internet-supported interactive learning.
7. It has the provision of digital storage and retrieval of educational software at convenience.
8. It creates an environment of virtual classrooms through computer conferencing, real-time as well as asynchronous.

## Model questions

- Define Teleconferencing. Discuss the importance of Teleconferencing in Education.
- Give a brief history of EDUSAT
- Explain the role of EDUSAT in field of education in the current scenario.
- Discuss how Videotext helps learner of Distance education.
- Discuss the educational importance of videodisc.

EDU: 201,

BLOCK- V

UNIT –l.FORMULATION OF INSTRUCTIONAL OBJECTIVES,

1.1. Concept of Instructional objectives,

1.2 Taxonomy of Instructional objectives,

1.3 Principles of formulating Instructional objectives.

OBJECTIVES:

At the end of the section the students will be able to :

(a) Recognise the following domain of educational objectives,cognitive,affective and psychomotor,
(b) Describe the objective as related to educational context,
(c) Distinguish between general and instructionalobjectives,
(d) Describe the characteristics of instructional objectives,
(e) Identify the categories of instructional objectives,
(f) Acquire the knowledge about the principles of formulating instructional objectives.

INTRODUCTION :

Learning take place when the students achieve what the teacher perceives as essentials to be achieved while a course or a unit of a course is taught in the classroom or outside it. In order to know if learning has actually taken place, the teacher should be clear about what they perceive as well as what they expect the students to learn. In other words the objectives of teaching must be specially defined so that the teachers keep those as frame of reference to find out if learning has taken place. It follows that instructional objectives is one of the salient features of effective teaching which indicate effective learning. The teacher has to generate the instructional objectives from the curriculum of a particular course and use this as a guideline for teaching.

1.1 CONCEPT OF INSTRUCTIONAL OBJECTIVES:

Instructional objectives are basically statements of what the learner is expected to be able to do after receiving an instruction or after going through some learning experiences. Instructional objectives are also known as behavioural objectives or learning objectives which clearly describe anticipated learning outcome. Instructional objectives are observable, measurable, specific and short term. These can be adequately expressed in operational term. Instructional objectives help the teachers to adopt appropriate teaching strategies and evaluation methods and to help students to achieve expected end point of ultimate learning. Instructional objectives indicate the desirable

knowledge, skills or attitude to be gained .Educational objectives include instructional objective a one of its components.

Check yourself: 1.

(a) What is meant by Instructional objectives?
(b) Mention three characteristics of Instructional objectives.

1.2 TAXONOMY OF INTRUCTIONAL OBJECTIVES:

Taxonomy refers to naming or classification or identification. Taxonomy of Instructional objectives means naming the different behavioural objectives that is expected to or desired to be achieved by the learners after undergoing some learning experiences. There are mainly three important domain that differentiate behaviour of the learner.These are -

(i) Cognitive (knowing) domain: This reveals activities like remembering, recalling, knowing, thinking, problem solving etc.The cognitive domain of instructional objectives is concerned with the intellectual aspect of mental process. This category consists of cognitive or thinking abilities. The six levels of learning in this domains are :

(a)Knowledge: Knowledge is the lowest level of cognitive learning. The ability to recall or recognise specific and universals, patterns and processes and ideas and facts are defined as knowledge level of learning.

(b)Comprehension: Understanding what is being communicated and translating it through other means, interpreting specifics and extrapolation of the content communicated form this category.

(c)Application: It is the middle level objective of cognitive domain.Abstruct finds an application component when it is used in practical situations.

(d)Analysis: Analysis leads to clarifying and organising the different forms of communication and thereby expressing a relationship among them.This category develops the reasoning ability of the students.

(e)Synthesis: In synthesis, all the elements are analysed in such a way that they form a pattern or structure. By combining and organising the elements a unique whole emerges.This objective enables to develop creative ability among students.

(f) Evaluation: All the earlier categories are prerequisites of this category.The value of matter and method is assessed, quantitavely and qualitatively with reference to any given criteria.

A teacher identifies the teaching objectives in relation to three aspects namely needs of students, level of entering behaviour of the students and content the subject matter. Based on these he states the objectives in terms of the learning outcomes of the students.

(ii) Affective(feeling) domain: This includes instructional objectives which emphasis a feeling ,an emotion a degree of acceptance or rejection.Krathwohl (1964) and his associates analysed the affective domain instructional objectives into five categories namely :

(a) Receiving (attending):At this level the learner is sensitised to the existence of certain stimuli and willing to respond and attend to the stimuli.

(b) Responding: when the student is sufficiently motivated he responds or actively attends and enjoys the activities.

(c) Valuing: The category of valuing includes worth of a thing or behaviour.

(d) Organisation: It refers to conceptualization process and synthesization of knowledge and value system.

(e) Characteristics of a value: This refers to internalized and develop ment of philosophy of integrated values and beliefs

.

This taxonomy deals with interest, attitudes values appreciation and adjust ment.

(iii) Psychomotor (doing) domain: This gives emphasis upon habit formation naturalization, coordination control manipulation, impulsion etc.According to Harrow"s classification psychomotor domain has six major categories :

(a)Reflex movements that occurs without our conscious effort and they can be segmental intersegmental or supersegmental.

(b)Basic fundamental movements of locomotion and non locomotion.

(c)Perceptual abilities that refers to the discrimination in five sense perception namely seeing, touching hearing smelling and tasting.

(d)Skilled movements.

(e) Non –discursive communication which means the ability to communicate through expressive and interpretive movement.

The psychomotor domains deal with abilities and skills which are physical in nature but activated by an inner mental process.

Check your self -2

(i) What is meant by taxonomy in Instructional objective ?

(ii)Name the domains that influences on Instructional taxonomy.

(iii) Mention three activities that can be included in cognitive domain.

(iv)What is meant by affective domain ?

(v)What is psychomotor domain ?

## 1.3 PRINCIPLES OF FORMULATING INSTRUCTIONAL OBJECTIVES:

Certain principles are expected to be kept in mind while formulating Instructional objectives. The main principles are—

1. Principle of selection: While determining a particular objective a numbers of factors are taken into consideration like learning materials, learner's capability, availability of resources, quality of teachers etc.

2. Principle of motivation and preparedness: Motivation and preparedness of both mental and physical state of the students and teachers play a significant role in achieving educational or instructional objectives.

3. Principle of correlation with environment: It is very essential to identify the elements in the environment having a natural correlation with the curricular content. Use of economic physical socio-cultural environment in and around the school makes learning more concrete, meaningful and real.

4. Principle of individual difference: No two individuals are same in this world. Paying attention to individual difference while formulating instructional objectives is one of the fundamental pedagogic approaches.

5. Teaching strategies: Instructional objectives and teaching strategies are directly linked with each other.Transperancy in teaching strategies makes easier to think about the ultimate of the instructional objective.

6. The principle of feedback or behaviour indicators that reflected in various interactions and activities within the group and outside of the group.

Check your self -3

(i) What is meant by Individual difference?
(ii) What is meant by Teaching strategies?
(iii) Write about the principles of motivation and mental preparedness while formulating Instructional objectives.

LET US SUM UP:

Instructional objectives are the statements of what the learner will be able to do after receiving an instruction or go through learning. Instructional objectives can also be called as behavioural objectives which are measurable observable and specific. The three domains of instructional objectives are cognition, affection and psychomotor. Cognitive domain reveals knowledge based

activities, affective domain emphasizes feelings or degree of acceptance and rejection and psychomotor domain domain gives emphasis on various activities like habit formation, coordination, control manipulation etc.The major principles of formulating instructional objectives are –Principles of selection, motivation, individual differences of the learners,coorelations with the existing environment etc.

KEYWORDS :

(i) Naturalize: to adopt, to introduce.

(ii)Pedagogic approaches :psychological approach.

(iii)Teaching strategies: Steps that adopted by a teacher in teaching.

SUGGESTED READINGS:

(i) Vedanayagam.E.G. , Teaching technology for college teachers.

(ii) Goswami Meena Kumari, Educational Technology.

(iii) Agarwal J.C., Principles and methods of teaching.

POSSIBLE ANSWERS TO CYP:

Answers of CYP-1

(a) Instructional objectives are the learning or behavioural objectives which clearly describes an anticipated learning outcome.
(b) Instructional objectives are observable,measurable,specific.

Answers of CPY-2

(i)It means naming or classification of instructional objectives.

(ii)Cognitive affective and psychomotor.

(iii)Knowing, thinking , problem solving etc.

Answers of CPY-3

(i)The differences that seen between the persons of the world on the basis of their various kinds of traits and characteristics can be called as individual differences.

(ii)Different steps that adopted in teachig to make teaching learning more meaningful is called Teaching strategies.

REFERENCES:

Das B.C., Educational Technology.

Pandey V.C., Educational Technology.

Agarwal J.C., Gupta S., Elementary Educational Technology.

MODEL QUESTIONS:

(a) What is meant by Instructional objectives? Discuss the principles of formulating Instructional objectives.

(b) Discuss the taxonomy of instructional objectives.

(c) Write short notes on the following: (i)characteristics of instructional objectives, (ii)cognitive domain (iii)affective domain, (iii)psychomotor domain.

# UNIT 2: TASK ANALYSIS:

2.0 Objectives

2.1 Introduction

2.2 Concept of Task Analysis

2.3 Characteristics of Task Analysis

2.4 Objectives of Task Analysis

2.5 Check Your Progress - 1

2.6 Types of Task Analysis

2.7 Check Your Progress – 2

2.8 Content Analysis: An Overview

2.9 Check Your Progress –3

2.10 The Application Aspect of the Content Analysis

2.11 Let us sum up

2.11.1 Key Words

2.11.2 Suggested Readings

2.11.3 Model Answers to Check your progress

2.11.4 Model Questions

## 2.0 OBJECTIVES:

Success of any teaching learning process depends upon the systematic and objective presentation of learning material in a logical sequence. Task analysis is a systematic process of reducing the complexity of a given task. After studying this unit, the students may be able to -

- Define the term task analysis
- Explain the salient features of task analysis
- Analyse the stages involved in the process of task analysis
- Can give an overview on the concept of content analysis.

## 2.1 INTRODUCTION:

Task analysis is an effective way of planning the teaching learning skills in an effective manner. It is a process of dividing the task into smaller components which require

several steps to be performed in a specific order. Task analysis can often be used to take a much larger group of skills and break them down into phases. The phases can be taught as smaller sections helping to assist in mastering of the larger task. Task analysis is an effective practice which can be used in family, society and in academic institutions. Task analysis is a process with the help of which the students develop their knowledge, skills, attitude, reflective thinking capacity and participative ability. By dividing the complex teaching learning task into smaller logical parts, the students can recall information better, can distinguish between different parts, can understand things better, can explain ideas and concepts better and can apply those information in a new way.

## 2.2 CONCEPT OF TASK ANALYSIS:

Task analysis is a system of breaking the parts of a teaching learning process into smaller components. As the smaller steps are mastered, the learner becomes increasingly independent in his or her ability to perform the larger skill. The major objective of task analysis is to identify the different elements or factors which constitute a task and to break those elements into smaller logical sequence. It develops the capacity of a learner to perform a particular task. Task analysis is a systematic process of performing the task to achieve some desirable objectives. Task analysis includes the detailed description of activities need to perform a desired task. Task analysis is a process of organizing the teaching learning activities and then performing these activities under a detailed scheme of action. In task analysis, first activity is to frame a pre-determined strategy, detailed scheme of action which the planner sets in advance for completing a particular task. After that the teacher divides the task of teaching and learning in a sequential logical sequence. The next activity is identifying the desired behaviour, then helping the learner to perform every task and lastly the teacher evaluates the learner's performance and on the basis of such performances, the teacher evaluates his or her desired behaviour along with necessary suggestive measures.

## 2.3 CHARACTERISTICS OF TASK ANALYSIS:

Task analysis has the following characteristics:

**(a)** It is a process ***of dividing the complex task of education into smaller components,*** in a logical sequence.

**(b)** In task analysis the ***objectives are set in advance.*** The educational planner selects the specific objectives related with the task which are set in advance for achieving a desired goal.

**(c)** In task analysis, the ***teacher arranges the teaching learning situation.*** The teacher generates the learning structures, learning activities and learning environment which the student need to perform to accomplish the tasks.

**(d)** Task analysis enables the ***appropriate sequencing of learning*** parts in a logical manner.

**(e)** The ***teacher works as a facilitator*** in task analysis. The teacher's duty is to integrate the student's activity. The main task of the teacher is to guide the student's activity so that the main learning objectives can be achieved.

**(f)** The teacher ***monitors how much the objectives of education are achieved.*** After completion of the task, the teacher evaluates the learning performances of the learner and provides suggestions for necessary modifications if needed.

## 2.4 OBJECTIVES OF TASK ANALYSIS:

The major objectives of task analysis are –

**(a)** To ***identify*** the different elements of a learning task.

**(b)** To ***organize*** the parts of a particular task in a sequential order.

**(c)** To ***facilitate*** the learner to perform the specific task one after the other.

**(d)** To ***achieve*** the mastery over the complete learning components after completing the pre-determined specific tasks.

## 2.5 CHECK YOUR PROGRESS – 1

I What is Task Analysis?

_____

_____

_____

_____

II Illustrate the salient features of task analysis

_____

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_____

_____

III What are the objectives of task analysis?

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_____

## 2.6 TYPES OF TASK ANALYSIS:

Task analysis can be divided into three categories –

(a) Content Analysis

(b) Job Analysis

(c) Skill Analysis

**(a) Content Analysis:**

In this task analysis, the subject matter is divided into sub-topics or sub-units. Content analysis systematically describes the written, spoken and visual communications. Here, the subject- matter is broken down into categories and then summarized. It is an objective process. All these units are arranged into a logical sequence. This is purely an educational and intellectual activity. This kind of task analysis deals with the cognitive aspect of the learner. Many content analyses involve media - print (newspapers, magazines), television, video, movies, the Internet and so on.

**(b) Job or Performance Analysis:**

Job analysis is a process to identify and determine in detail the particular job duties and requirements and the relative importance of these duties for a given job. This type of analysis is concerned with the tasks related with some professional activity. Job analysis specifies how each job is performed, step by step. Here, the trainers develop training materials to give training about how to perform a task. Groups of job analysis may include high- and low-performing employees, managers, supervisors, trainers and others.

**(c) Skill Analysis:**

Skill analysis are done for specific activities. Skill analysis breaks the complex skills into smaller parts required for a particular task. Skill analysis distinguish the different skills related with a specific task and arranges those skills in a sequential order. Skill analysis focus on the important parts of the skills without being distracted by the skills that are not the part of the task. Examples of skill Analysis includes job, life and personal skills. ... Skills. Critical thinking; Data-analysis; Numeracy; Reporting and so on.

## 2.7 CHECK YOUR PROGRESS – 2

I Illustrate with example the types of task analysis

_____

_____

_____

_____

## 2.8 CONTENT ANALYSIS: AN OVERVIEW

Content analysis is an objective and synchronized description of contents or subject-matter. Content analysis is used to determine the presence of certain words, concepts, themes, phrases, characters, or sentences within texts or sets of texts and to quantify this presence in an objective manner. To conduct a content analysis on a text, the text is coded, or broken down, into some smaller sequential parts and then each part is examined separately. After that feedbacks are given for more objective modifications of each part. The teacher has to identify the various sources of content analysis and has to present the structure of the content in a proper sequence.

For analysing the content systematically, the teacher first need to have a mastery over the subject-matter. Secondly, the needs, abilities, interest of the learner should get top priority while analysing the content. Moreover, some other criteria should be kept in mind while analysing the content, such as deciding the objectives of teaching learning process, arranging a proper learning environment, maintaining the scope for further improvement etc.

## 2.9 CHECK YOUR PROGRESS – 3

I Discuss the concept of content analysis

## 2.10 THE APPLICATION ASPECT OF THE CONTENT ANALYSIS:

Content analysis includes several systematic steps. Those steps can be categorized under the following sections -

(a) Planning
(b) Organizing
(c) Implementing
(d) Evaluating

**(a) Planning :**

In this step, the teacher identifies the specific instructional objectives related with the content. The teacher organizes the teaching objectives keeping in mind the needs, interest and abilities of the leaner. This step determines the broad aims of the course. The teacher collects the necessary information of the content, makes brief note of all these information under some specific categories. After that the teacher can identify whether or not the categories can be linked any way to maintain a logical sequence.

**(b) Organizing:**

After the planning process, the teacher must create a proper learning environment where the content analysis can be implemented upon the students. For this purpose, the teacher can organize some specific teaching strategies and can select various teaching aids for implementing these learning activities.

**(c) Implementing:**

Here, the teacher works as a facilitator, counsellor, motivator, innovator and counsellor. He provides adequate learning environment to the students to perform their task. He

encourages the students to use various teaching skills for completing the task. Moreover, the teacher clarifies the doubt with necessary explanation. Here, the teacher identifies the proper learning sequence, decides the teaching strategy for reaching the goal, selects the media for teaching leaning. The teacher gives the actual teaching experiences through this.

**(d) Evaluating:**

Though this step, the teacher evaluates the effectiveness of achieving the goal through content analysis. Through evaluation, the teacher tries to know which objective has been widely attained and which remained unattained. Through this, the teacher tries to find out the strength and weakness of the course.

## 2.11 LET US SUM UP

- Task analysis is a system of breaking the parts of a teaching learning process into smaller components.
- As the smaller steps are mastered, the learner becomes increasingly independent in his or her ability to perform the larger skill.
- Support of the organization, relevancy, realistic approach, attainability, adaptability, inclusiveness etc. are some of the features which signify the meaning of organizational compliance
- To identify the different elements of a learning task, to organize the parts of a particular task in a sequential order, to facilitate the learner to perform the specific task one after the other etc. are some of the objectives of task analysis.
- Task analysis can be divided into three categories. They are content analysis, job analysis and skill analysis.
- Content analysis is an objective and synchronized description of contents or subject-matter.
- For analysing the content systematically, the teacher first needs to have a mastery over the subject-matter.

- Secondly, the needs, abilities, interest of the learner should get top priority while analysing the content.
- Moreover, some other criteria should be kept in mind while analysing the content. These criteria are deciding the objectives of teaching learning process, arranging a proper learning environment, maintaining the scope for further improvement etc.

## 2.11.1 KEY WORDS

**Task Analysis:** Task analysis is a process of dividing the task into smaller components which require several steps to be performed in a specific order.

**Content Analysis:** **A**nalysis of the subject matter or information of a particular content (such as a book or film) through a classification.

**Job Analysis:** Systematic identification of the fundamental elements of a job, and examination of knowledge and skills required for the job's performance.

**Skill Analysis:** Skill analysis breaks the complex skills into smaller parts required for a particular task.

## 2.11.2 SUGGESTED READINGS

Aggarwal, J. C. (2005) *Essentials of Educational Technology: Teaching Learning, Innovations in Education.* Vikas Publishing House Private Limited, New Delhi.

Bhatia, R.L. and Bhatia Ahuja (2003) *Principles of Educational Technology and their Application,* Surjeet Publications, Delhi.

Das, B. C. (2010) *Educational Technology,* Kalyani Publishers, Delhi.

Sampath, K., Panneerselvam, A., and Santhanam, (2003),

*Introduction to Educational Technology, (Fourth Revised Edition),* Sterling Publishers Private Limited, New Delhi.

Sharma, A. R. (2000) *Educational Technology,* Vinod Pustak Mandir, Agra.

## 2.11.3 MODEL ANSWERS TO CHECK YOUR PROGRESS

***Check your Progress- 1***

Ans to Q No 1: Task analysis is a system of breaking the parts of a teaching learning process into smaller components. As the smaller steps are mastered, the learner becomes increasingly independent in his or her ability to perform the larger skill.

Ans to Q No 2: Task analysis has some salient features. Some of them are like dividing the complex task into smaller components in a logical sequence. Here the objectives are set in advance. The teacher arranges the teaching learning situation into small components and analyses each component specifically. Here the teacher works as a facilitator.

Ans to Q No 3: The major objectives of task analysis are to ***identify*** the different elements of a learning task. After that it aims at organizing those parts into a logical sequence. The next goal is to facilitate the leaner to perform a specific task in a sequential order and lastly to help the learner to get mastery over the subject-matter by completing each specific task systematically.

***Check your Progress- 2***

Ans to Q No 1: Your answer should include the following points

(a) A Short introductory part of task analysis
(b) Detailed point wise description of each type of task analysis

(c) Concrete example of each type should be given

***Check your Progress- 3***

Ans to Q No 1: Your answer should include the following points

(d) A Short introductory part of content analysis

(e) The application part of content analysis need to be explained

(f) A summary of the concept of content analysis should be given

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## 2.11.4 MODEL QUESTIONS

1. What do you mean by task analysis? What are the basic features of task analysis?
2. Describe some essential features of task analysis.
3. Illustrate the stages involved in the process of task analysis.
4. How can task analysis be applied in the classroom settings? Explain in your own ways.
5. What is meant by content analysis in the teaching learning process?
6. How can content analysis be applied in actual classroom settings? Discuss the role of a teacher in such a setting.

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# Unit-3
# DESIGNING INSTRUCTIONAL STRATEGIES

**Structure**


3.0 Objectives
3.1 Introduction
3.2 Lecture Method
  3.2.1 Characteristics
  3.2.2 Merits and Demerits of Lecture Method
  3.2.3 Suggestions for Making Lecture Method More Effective
3.3 Team Teaching: Definition
  3.3.1 Characteristics
  3.3.2 Objectives of Team Teaching
  3.3.3 Principles of Team Teaching
  3.3.4 Types of Team Teaching According to Source and the Procedure Involved
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3.4 Seminar: Meaning and Definition
  3.4.1 Objectives of Seminar
  3.4.2 Various Roles Played by Individuals and Procedure of a Seminar
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  3.4.4 Merits and Demerits of a Seminar
3.5 Tutorials
  3.5.1 Merits and Demerits of Tutorial Method
  3.5.2 Suggestions to Make Tutorial Method More Effective
3.6 Brainstorming Strategy
  3.6.1 Fundamental Rules in Brainstorming Strategy
  3.6.2 Steps in the Brainstorming Strategy
  3.6.3 Merits and Demerits of Brainstorming Strategy
3.7 Educational Games
  3.7.1 Characteristics
  3.7.2 Merits and Demerits of Educational Games
3.8 Let Us Sum Up
3.9 Key Words
3.10 Terminal Questions
3.11 Suggested Reading
3.12 Model Answers to 'Check Your Progress'


## 3.0 Objectives

After going through this unit, you will be able to:

- Analyse some of the popular teaching methods
- Explain the characteristics of various teaching methods

- Give suggestions regarding how to make a particular teaching method more effective
- Comparatively analyse the different teaching methods in terms of its merits and demerits
- Decide upon which teaching method is the most suitable

## 3.1 Introduction

The child has certain peculiarities at every stage. In this modern age, the psychological viewpoint tells us that the study of any subject cannot be successful and complete unless it is based on the age and teaching methods, which play an important role along with its content. These teaching methods are determined by the teacher keeping in mind the capability of students and the curriculum. Thus, with the help of these methods the teacher imparts understanding of the subject matter along with the knowledge of the curriculum.

The teaching methods help the teacher to decide how he should teach his students. It is a fact that 'in the absence of the correct directions/true path, a person cannot reach his destination; in the same way, in the absence of a proper method, the student cannot be given correct knowledge'.

Irrespective of the subject, a teacher should keep in mind the following points while selecting the teaching methods:

- The assistant of method in achieving the objectives of teaching of the subject.
- The knowledge of the subject teacher pertaining to that particular method.
- The availability of apparatus and materials in the school required in that particular method.
- The nature of teaching and its requirement method.
- The class, age and capability of students.
- Opportunities for catering the need of individual differences.

A wide range of methods employed by a teacher for teaching different subjects are as follows:

- Lecture method
- Observation method
- Experimental method
- Demonstration method
- Lecture-cum-demonstration method
- Supervised-study method

- Heuristic method
- Project method
- Assignment method
- Discussion method
- Problem-solving method
- Review method
- Tutorial method
- Historical method
- Discovery method
- Question–answer method
- Role-playing method
- Brainstorming method
- Sensitivity training method
- Independent study method
- Laboratory method
- Filed trip method
- Team teaching
- Seminar
- Educational Games

We will discuss in detail some of these teaching methods in the following sections.

## 3.2 Lecture Method

Lecture means teaching a lesson in the form of speech or talk. The teacher delivers a lecture for a particular topic and the students keep listening in an idle manner. This method is generally useful at the higher-level classes. In this method, the information can be given about the contents of a particular topic, but the students cannot be motivated to attain knowledge and make use of the acquired knowledge. Through this method, it is difficult to find out the extent to which the student has been able to learn.

### 3.2.1 Characteristics

The characteristics of the lecture method are as follows:

- Useful for higher classes.
- It is easy, brief and attractive for teacher.
- More information can be given in a short time period.

- The argumentative flow of the subject is retained.
- This method gives a sense of fulfillment as regards the progress of the subject both to the teacher and the taught.
- The flow of thought is maintained and the teacher tells about many new things.
- It is a convenient method for the teacher.
- The teacher is always alert.
- A large number of students are taught at the same time.
- If the teacher makes the lecture interesting, the students are attracted towards it and interest in the topic is developed.

### 3.2.2 Merits and Demerits of Lecture Method

Like any other method, the lecture method also has its own merits and demerits as discussed in this section.

**Merits**

- Students are exposed to unpublished or not readily available study material.
- The teacher can precisely determine the aim, content, organization, pace and direction of teaching.
- Text material can be complemented and clarified through this method.
- Some of the individual learning preferences can be complemented.
- It facilitates a large-class communication.

**Demerits**

- The students are actively not involved in the learning process.
- This method involves only one-way communication.
- The student has to invest much of his time outside the classroom for understanding and long-term retention of the content. In contrast, interactive methods (discussion, problem-solving sessions) allow the teacher to guide the students while actively working with the material.
- The teacher should possess effective writing and speaking skills for this method.

### 3.2.3 Suggestions for Making Lecture Method more Effective

The teaching through the lecture method can be made more effective using the following principles:

- Make use of the black-board where and whenever required.

- Proper teaching aids should be used.
- More stress should be laid on the principle of generalization.
- The students should be given work to do so that they make use of their previous knowledge and acquire more knowledge on basis of their hard work and experience.
- In order to keep them active, questions should be put up to the students from time to time.

### Check Your Progress-1

1. What is the principle characteristic of a lecture method?

   _____

   _____

2. What is the main disadvantage of a lecture method?

   _____

   _____

## 3.3 Team Teaching: Definition

According to Carlo Olson, 'Team teaching' is defined as: 'An instructional situation where two or more teachers possessing complementary teaching skills cooperatively plan and implement the instruction for a single group of students using flexible scheduling and grouping techniques to meet the particular instruction.'

In the opinion of David Warwick, 'Team teaching is a form of an organization in which individual teachers decide to post resources, interests and expertise in order to devise and implement the scheme of work suitable to the need of their pupils and facilities of their school.'

The teachers participating in the team teaching decide or determine the activities themselves. In spite of this, the teachers assemble all the resources, interest and expertise. Thus, team teaching is a well organized system of teaching in which many teachers impart instructions to a group of students in a cooperative manner. These teachers plan the teaching and execute it for the group of students cooperatively. The plan of the teaching methods, time and the process are so flexible that the necessary changes in the programme of the team teaching can be brought about according to the teaching objectives and abilities of the teachers.

### 3.3.1 Characteristics

The characteristics of team teaching are as follows:

- Two or more teachers participate in the teaching.
- It is based on cooperation.
- All the participating teachers apply their resources, abilities and experiences.
- All the involved teachers plan teaching cooperatively and execute it.
- Evaluation is also made on cooperative basis.
- The needs of the pupils, and schools and existing resources are also considered.
- Various aspects of any topic or subject are taught by two or more teachers.
- Its main aim is to make the teaching–learning process more effective.
- The entire responsibility does not fall on one teacher only, but is shared by others too.
- The teachers decide their activities themselves.
- It is a technique of creating instructional conditions.
- Its plan is flexible.

### 3.3.2 Objectives of Team Teaching

The objectives of team teaching are as follows:

- To make classroom teaching effective according to the interests and capacities of the pupils.
- To encourage flexibility in grouping the pupils. In this, the grouping of the pupils in a subject is done according to the interests and aptitudes of the pupils.
- To increase the quality of the instruction.

### 3.3.3 Principles of Team Teaching

The various principles applied to the team teaching method are as follows:

**(i) Duration according to importance:** Allotting considerable amount of time to an unimportant subject makes team teaching ineffective. The duration should be decided on the basis of the subject's importance.

**(ii) Level of instruction according to pupils:** During team teaching, before imparting instruction to the pupils, the initial behaviours of the learners must be observed and the level of the instructions should be according to the pupils.

(iii) **Objective-based supervision:** The type and the method of supervision depend upon the objective of the group. Therefore, the objectives of the group must be kept in mind at the time of supervision.

(iv) **Appropriate size and composition:** The limited size of the class is a matter of the past. The size of the group changes according to the objective of team teaching. Therefore, the size and composition of the group of the pupils should be appropriate according to the objectives of the group and learning experiences.

(v) **Appropriate duties assigned to teachers:** It is necessary for team teaching that the division of duties and responsibilities of the teachers should be appropriate. These duties should be assigned to them according to their academic merit, interests and their personality traits. Hence, in team teaching, the team members are selected very carefully.

(vi) **Proper learning environment:** The teaching is successful if a proper learning environment is provided, such as a provision of library, laboratory, workshop, etc.

### 3.3.4 Types of Team Teaching According to Source and the Procedure Involved

The method of team teaching originates from different sources. Three of the sources have been briefed out as follows:

(i) **From a single department:** Here, the teachers belong to the same department. Such an arrangement is done for secondary and higher secondary classes. It is possible only if there is more than one teacher for one subject.

(ii) **From various departments of a single institution:** Here, a team of teachers of different subjects is constituted and this team is used for the training purpose. For instance, teachers in Psychology, Philosophy and Sociology are included in a team and the teaching task such as training for B.Ed., M.Ed., etc. is organized very easily. In short, team teaching encourages interdisciplinary teaching.

(iii) **From a single department of various institutions:** Here, specialists from different institutions are also invited. Such team teaching can be managed at every level and for every topic. This form of team teaching proves to be more useful and encourages cooperative teaching. The effective use of this team teaching is possible in cities where there are more than one training institutions.

The procedure of team teaching involves the following three steps:

(i) **Planning:** First of all, the plan of the team teaching method is prepared. In order to prepare a plan of team teaching, the following activities are performed:

- Determining the objectives of team-teaching.
- Writing the objectives of team-teaching in behavioural terms.
- Identifying entering behaviours of pupils.
- Deciding the topics for teaching.
- Preparing an outline for teaching a topic.
- Assigning duties to the teachers looking at the interests of the pupils and their skills.
- Determining the level of the instructions.
- Deciding the evaluation techniques.
- Creating learning environment and teaching material.

**(ii) Organization**

- The teacher asks some initial questions in order to decide the level of the instruction. Only then he can set the level of the instruction.
- The communication technique is selected keeping in view the pupils' knowledge of the language.
- A teacher delivers lead lecture while the other member-teachers of the team listen to it. They note down the important points specifically which are difficult for the pupils to understand them.
- The other teachers of the team also deliver lectures and clarify various elements.
- Pupils' activities are reinforced. The teacher encourages the pupils.
- The pupils are asked to perform certain tasks in the class.

**(iii) Evaluation of the results**

- Decision is taken regarding the achievement of objectives and performances by the pupils.
- Necessary modifications are introduced in the planning and organization phase on the basis of evaluation.
- Oral and written questions and practical methods are followed. Each question evaluates some objective.
- The shortcomings and problems of the pupils are diagnosed and remedied.

### 3.3.5 Merits and Demerits of Team Teaching

Team teaching has the following merits and demerits:

**Merits**

- Improves the quality of instruction given.

- It is economical in terms of time and energy.
- It helps in maintaining the discipline in the class.
- It provides exposure of the group to more specialists.
- It helps in development of the professional status of the teachers.
- It also helps in development of human relations, which are very essential for social adjustment.
- It provides stimulus to the ideas of the pupils and teachers and gives them opportunity for free discussion.
- Team teaching develops the strong will and responsibility of participating among the pupils and teachers.
- It is a flexible method. The school building, school staff and other resources of the school can be used very flexibly. Team teaching helps in getting rid off the traditional time table also.
- It can be best utilized in the step of evaluation. All the teachers get opportunity of evaluating the task of every teacher. Essential suggestions can be provided so that the necessary modifications can be applied.

**Demerits**

- **Costly method:** It is costlier than the traditional teaching.
- **Lack of accommodation:** In comparison to the traditional teaching, more rooms and furniture are required. Hence, due to the scarcity of space and building, the effectiveness of team teaching becomes doubtful.
- **Lack of cooperation:** This method is based on cooperation. But sometimes teachers hesitate to cooperate among themselves. Hence, cooperation becomes a limitation in this method.
- **No delegation of power and responsibilities:** It needs the division of powers and responsibilities which are lacking in the present school management because no manager will like to delegate his powers.
- **Disregard to the dynamics of small group:** No specific type of guidance can be imparted because during team teaching school staff cannot function like a football team.
- **Lack of research work:** Being a new concept, it lacks research work. It is being used on the basis of trial and error method.
- **Conflict in the roles of teachers:** Different teachers have different roles, which increases the load of the teachers. One teacher considers the other's role as a hurdle. In such conditions, the teachers face tough time to maintain the balance and coordination.

- **Diversification in the views of teachers:** No two people think alike. This is true for this method also. When different teachers work together, it becomes difficult to eliminate diversification in their views. Unification in their ideas becomes very difficult as some teachers may want to make the curriculum more comprehensive, whereas others will want to delimit it.
- **Conflict Between Change and Traditionalism:** There is always a possibility of conflict between new methods and traditionalism. The emerging new methods have created unrest and panic among traditional teachers. Such teachers try to resist these changes.

### Check Your Progress-2

1. Define team teaching as per Carlo Olson.

   _____

   _____

2. What is the main factor on which team teaching is based?

   _____

   _____

3. List the objectives of team teaching.

   _____

   _____

## 3.4 Seminar: Meaning and Definition

Seminar is an instructional technique of higher learning which involves paper reading on a theme followed by the group discussion to clarify the complex aspects of the theme. It generates a situation for a group to have guided interaction among themselves on a theme which is generally presented to the group by one or more members. The person who presents the theme should have studied the theme thoroughly to make selection of relevant material. The collected material is presented in the form of a paper reading. It provides the structure of the theme, to facilitate its communication.

### 3.4.1 Objectives of Seminar

The two main objectives of a seminar method are described as follows:

**(i) Cognitive objectives**

- To develop the higher cognitive abilities: analysis, synthesis and evaluation as compared to the situations involving human interaction.

- To develop the ability of responding in this manner would involve higher cognitive actions: valuing, organizing and characterization of quick comprehension of the situation, examination, of it against the knowledge he possesses and construction of his reactions to the situation.
- To develop the ability of keen observation experiences, feelings and to present them effectively.
- To develop the ability to seek clarification and defend the ideas of others effectively.

**(ii) Psychological objectives**

- To develop the sense of tolerance and opposite ideas of others.
- To develop the sense of cooperation with other colleagues and respect the ideas and feeling of the others.
- To develop the emotional stability among the participants of the seminar.
- To acquire the good manners of putting questions and answering the questions of other effectively.
- To develop good manners and skills among the participants.

### 3.4.2 Various Roles Played by Individuals and Procedure of a Seminar

A seminar involves the active participation of the following people who play their individual roles:

**(i) The organizer**

An organizer plans and prepares the whole programme of the seminar. He decides the topic or theme of the seminar and assigns different aspects of the theme to different speakers. The date, time and place are decided by him. He also suggests the name of convener of the seminar. He prepares the total schedule of the seminar.

**(ii) The president**

The participants propose the name of a chairman, who is well acquainted with the theme of the seminar. He must know his rights and duties as a chairman of the seminar. The seminar's activities are conducted by the convener. Who directs the whole programme, encourages the participants to take part in the discussion, and keeps the discussion according to the theme of seminar. In certain situations he also takes part in the discussion. He provides sufficient opportunities to each participant. At the end, he summarizes the discussion and presents his viewpoint on the theme. He gives thanks to the speakers, participants, guests and observers.

**(iii) The speakers**

The organizer assigns topics to the speakers, who study the topics thoroughly and prepare papers. Photocopies of the papers are distributed among the participants before the commencement of the seminar, so that they may also prepare themselves on the theme. It encourages discussion to last long. The speakers should be ready to defend their positions. They should have tolerance for anti-ideas or criticism of others.

**(iv) The participants**

There are 25–40 participants in the seminar. The participants of the seminar should be well acquainted with the theme. They should appreciate the performance of the speakers. They should be able to seek clarification and put questions. They should place their own ideas regarding the theme and on the basis of their experiences. They should address the president for seeking clarification. They should not put question directly to the speakers.

**(v) The observers**

Some guests and observers are also invited and allowed to observe the activities of the seminar. They should be allowed to discuss and present their observations by permission of the chairman.

**Procedure of seminar**

Participants in a seminar have guided interaction among themselves on a theme which is generally presented to the group by one or more members. The person who presents the theme should have a sound knowledge about the theme beforehand. This would mean selection and organization of relevant material. This organized material is put in the form of a paper circulated among members in advance. The paper helps structure the theme, facilitates its communication and focuses the scope for discussion. After the theme is presented, it is discussed by the group. During the discussion participants may do any of the following:

(i) Seek clarifications of the theme presented

(ii) Make observations in the light of their knowledge and experience regarding the theme

(iii) Raise issues relating to the theme for further analysis and evaluation.

**Proceedings**

Proceedings of the seminar are guided by a chairman who should be well aware about the theme. His role would be to keep the discussion on track, stimulate maximum participation and consolidate the viewpoints expressed at appropriate stages. As an instructional technique, a seminar seeks to provide maximally for interaction among the members. Therefore, sufficient time should be allowed for the discussion session. If this necessitates cutting down the

time for presentation, it should be done as the main purpose of the presentation is to initiate the discussion.

**Interaction**

The interaction in a seminar is similar to the field of forces present in machines. Different viewpoints or opinions expressed represent forces in varied directions. However, unlike physical forces which at times become neutral when acting in opposite direction, the different viewpoints or even opposite opinions will not result in neutrality, but will induce further thinking among participants. This stimulation for further thinking should be reckoned with significance as the net instructional value of the seminar. When there is an agreement of ideas among individual members, these may be considered as forces acting in the same direction and thereby having a reinforcing affect on the individual's view on the theme. In either case, the participant is benefited as he is either led to further analysis and evaluation of his viewpoints, or helped in validating and thus strengthening them.

### 3.4.3 Types of Seminars According to Levels of Organization

The different types of seminars can be arranged on the basis of the organizational levels, i.e. the size of the seminar group and the level or platform on which it is organized. Some seminars may be very small, whereas others may involve a wide range of participants even on an international basis. So we will briefly discuss the various categories or types of seminars that can be arranged as follows:

**(i) Mini seminar:** A mini seminar is organized to discuss a topic in a class. Its purpose is to train the students for organizing the seminar and play different roles. It is a stimulated situation for the students. Such seminars should be organized before the main seminar is scheduled so that the participants can be prepared for the event.

**(ii) Main seminar:** The main seminar is organized at a departmental level or institutional level on a major theme. All the students and staff members take part in main seminars. These seminars are organized weekly or monthly in various departments. Generally specific themes are selected for the main seminars.

**(iii) National seminar:** A national seminar is organized by an association or organization at a national level, i.e. universities or institutions all throughout the country take part in such seminars. Experts are invited on the theme of the seminar. The secretary of the seminar prepares the schedule theme, time, dates, days and venue. University departments, colleges or institutions organize such seminars at a national level on different issues of the Education, Teacher Education and Educational Researches in the country.

(iv) **International seminar:** International seminars are organized by UNESCO and other international organizations on a very broad topic or theme such as students' unrest or activism, innovations in teacher education and examination reform, etc. A nation can also organize such seminars on international theme.

### 3.4.4 Merits and Demerits of a Seminar

**Merits**

- It has the potential to develop several abilities among participants.
- Ideas tend to be developed due to the stimulation of thinking brought about through interaction, different higher cognitive abilities like, analytical and critical thinking, synthesizing and evaluating.
- Affective attributes like tolerance for other's views, openness to ideas, cooperation with others, emotional stability and respect for other's feelings may be inculcated among the participants during the course of such sessions.
- The norms of behaviour for the group in a seminar are the same as those in a democratic society. Deliberate efforts have to be made to adhere to these norms during the course of the seminar discussion. It would gradually inculcate the affective attributes in the participants.
- Seminar develops better learning habits. While preparing for presentation and participating in the discussion learners get induced to pursue independent study, engage in post-seminar discussions covering the themes discussed as well as related ones and develop critical outlook to any idea thereby leading the learner to self-initiated learning is more permanent in nature.
- Seminar makes the instruction learner-centered and provides for learning through enquiry based on the natural inquisitiveness in human beings.
- Seminar establishes natural learning at all levels of instruction through it is mainly confined to higher education.

**Demerits**

- It cannot be organized on all the content of a subject matter. Its theme should be such on which discussion may be held.
- It cannot be used at all levels of education, but is only applicable at a higher level of education. As the members of the seminar should have social and emotional maturity, it cannot be used for lower level of education.

- When habitual speakers dominate the discussion they do not provide opportunities to others to take part in the seminar. Thus, the discussion confines only to a few persons rather than whole group.
- When groups are formed propounding anti-ideas and favourable ideas on the theme, both try to win over the other. Therefore, the purpose of the seminar is not served. The chairman should discourage this type of discussion.
- Criticism is made for the sake of criticism. The instructional situation of such discussion is not conducive for learning.

### Check Your Progress-3

1. What does the term 'seminar' imply?

   _____

   _____

2. What are the two main objectives of a seminar?

   _____

   _____

3. List the various types of seminars.

   _____

   _____

## 3.5 Tutorials

Tutorial method is the method of teaching which can be used individually or for groups. Lawrance Urdang has written about this method of teaching as follows:

'It is a session of intensive instruction by a tutor. It is a system of education in which instructions are given by tutor (teacher) who also acts as a general advisor'.

In this teaching method the class is divided into small groups, the teacher goes to these groups and tries to locate their problems and helps them find the correct solutions.

In the tutorial, apart from the personal problems of the students, problems related to their studies are also taken care of. That is why this method is also known as 'Intensive Instruction' method. Cognitive and affective objectives can be achieved through this method. This method is useful for teaching small children and adults. Tutorials are of the following three types:

- Supervised tutorial: Here, the teacher and the students take part in personal talks and discussions.
- Group tutorial: Here, the average students are given special guidance.
- Practical tutorial: Here, the help is given related to practical and laboratory work, etc.

Psychomotor processes are studied and their solution is found. For development of values this method is very useful for dull and bright students alike.

### 3.5.1 Merits and Demerits of Tutorial Method

**Merits**

- Takes care of the remedial aspect of teaching.
- Problems of the students are solved by making use of their previous knowledge.
- Helps in achieving cognitive and affective objectives.
- Helps in improving the achievement level of the students.
- Can be used for individuals or groups as per requirements.

This is very true that 'Tutorial strategy is best suited for the development of application, evaluation, synthesis, expression, communication, interests and attitudes. It involves simple to complex tasks or abilities (in a problem-solving situation closed as well as open-ended) involving new unfamiliar areas'. In this process, the students are given small hints or clues in the beginning which are gradually withdrawn while solving the problems.

**Demerits**

- The teacher is able to solve the problems related to his own subject. They do not take interest in other subjects.
- The teachers sometimes pay attention to a selected few students, whereas in a tutorial attention should be paid to each individual of the group.
- Some students do not give opportunity to others to speak.
- The various groups develop competitive spirit.
- The teacher should have knowledge of the psychology of the students.

### 3.5.2 Suggestions to Make Tutorial Method more Effective

While making use of this method, the following points should be kept in mind to make the process more effective and fruitful:

- The teacher should remain impartial and pay attention to all the students.
- The teachers should be allotted tutorial classes according to their experience, interest and specialization.

- The main objective should be to solve the problems of the students.
- All students should be given equal opportunity to put forth their problems and ideas.
- As far as possible, the process of group formation should be psychological.
- Along with improvement in the teaching process, the objective of this method should be development of problem-solving skills on a regular basis.
- Proper attention should be paid to rivalry and jealousy among students.

### Check Your Progress-4

1. Define the tutorial method of teaching.

   _____

   _____

2. Mention the different tutorial methods available.

   _____

   _____

## 3.6 Brainstorming Strategy

In general terms, brainstorming strategy refers to a group or individual creativity technique with the help of which a conclusion or solution for a specific problem can be found out by amalgamating a list of ideas spontaneously contributed by its members. This particular term was popularized or coined by Alex Faickney Osborn, an advertising executive, in 1953, in his book 'Applied Imagination'. Osborn stated that brainstorming was a more effective technique as compared to individuals working alone in generating ideas, although more recent research has questioned this conclusion.

The characteristics of the brainstorming strategy are the following:

- It is a completely permissive style of teaching strategy.
- It is based upon an assumption that a student can learn better in a group rather than in isolation.
- It is a problem-oriented strategy of teaching.

### 3.6.1 Fundamental Rules in Brainstorming Strategy

According to Osborn (1963), there are four fundamental rules in brainstorming which aim at minimizing social inhibitions among team members, motivate generation of ideas and increase the overall creativity. These are as follows:

(i) **No criticism:** Criticism of ideas is avoided during a brainstorming session as the main objective of the session is to generate diverse and unusual ideals, and extend or add to these ideas. Criticism is done at the evaluation stage of the process. Thus the members are at ease when it comes to present new ideas which are unique and unusual.

(ii) **Welcome unusual ideas:** Unusual ideas are welcomed as it is normally easier to 'tame down' than to 'tame up'. These innovative ideas of thinking and looking at the world tend to provide us with better solutions.

(iii) **Quantity wanted:** The more the number of ideas generated, the greater will be the chance of coming up with a radical and effective solution.

(iv) **Combine and improve ideas:** A variety of ideals are preferred, but at the same time we also need to combine these ideas in order to make them better.

### 3.6.2 Steps in the Brainstorming Strategy

Osborn has suggested the following steps for his strategy of teaching through this particular method:

- The participants should be from a wide a range of disciplines with as broad a range of experience as possible. This helps in generating more creative ideas in the session.
- A summary of the problem should be written down. The leader should guide the session, initially explaining the problem to be solved with any criteria that must be met, and then keeping the session on track.
- Use the description to get everyone's mind clear of what the problem is and post it where it can be seen. This helps in keeping the group focused.
- Encourage an enthusiastic, uncritical attitude among brainstormers and participation by all members of the team. Encourage them to solve the problems as well as have fun in the process!
- Write down all possible solutions that come to the mind (even ribald ones). It is very important not to interpret the idea.
- Do not evaluate ideas until the session moves to the evaluation phase. Once the brainstorming session has been completed, the results of the session can be analysed and the best solutions can be considered.

- Do not cancel out any solution, no matter how silly or weird it sounds. These may often lead to creative solutions. The main motive is to open up as many possibilities as possible, and break down preconceptions about the limitations of the problem.
- The leader should keep the brainstorming session focused on subject, and should try to steer it towards the development of some practical solutions.
- Once all the solutions have been written down, evaluate the list to determine the best action to correct the problem.

### 3.6.3 Merits and Demerits of Brainstorming Strategy

**Merits**

- It has both psychological and educational basis of teaching.
- It is more creative strategy of teaching and encourages for the original ideas.
- It provides more ideas of good quality.
- It creates the situation for more independent thinking among learners.

**Demerits**

- Participants are compelled to listen to others and may spend time repeating their ideas until they get sufficient attention.
- Going through the protocol, processing and ordering the ideas can become a complex procedure. This also depends on the number and order of the generated ideas.
- Advising participants to let others speak without making them feel offended or intimidated can be difficult.
- Participants with the ability to express their ideas faster and communicate in a more effective manner have an edge over the group and get the general attention of the group. Some form of leadership can be formed in this way within the group, which might make participants feel inferior.
- On the one hand, people are not very skilled at controlling their non-verbal reactions and might influence the creativity of others with their posture, gestures or facial expressions. On the other hand, attempting to control their non-verbal behaviour might inhibit their own creativity.
- Introvert participants may find themselves in a position where they are unable to express their unique or unorthodox ideas.

**Check Your Progress-5**

1. What does brainstorming strategy refer to?

   _____

   _____

2. Which are the principle characteristics of a brainstorming strategy?

   _____

   _____

## 3.7 Educational Games

Games fulfill a number of educational purposes. Certain games may be exclusively designed for imparting some kind of education, whereas others may have incidental or secondary educational value. All types of games may be used in some way or the other for an educational environment. An educational game is defined as a game designed to teach humans about a specific subject and to teach them a skill. As teachers, governments and parents realize the psychological need and benefits of gaming on the learning process, this educational tool has become an important means of imparting education. Games refer to interactive play that teaches us goals, rules, adaptation, problem-solving, interaction, all represented as a story. They provide us with the fundamental needs of learning by giving enjoyment, passionate involvement, structure, motivation, ego gratification, adrenaline, creativity, social interaction and emotion.

Educational games are the games that are designed to teach people the following:

- About certain subjects
- Expand concepts
- Strengthen the development process
- Understand a historical event or culture
- Help them in learning a skill as they play.

The different types of educational games include the following:

- Board games
- Card games
- Video games

Educational games are defined as individual or group games that have cognitive, social, behavioural and/or emotional dimensions which are related to educational objectives.

### 3.7.1 Characteristics

Games often have a fantasy element that engages the students in a learning activity through narrative or storylines. The built-in learning process of games is what makes a game enjoyable. A player progresses in a particular game through the process of learning. Throughout the game, the mind of the player is engrossed and he grasps and understands a new system. The understanding of a new concept through gaming helps a student or a player to feel a sense of reward, irrespective of the fact that the game is considered for entertainment or serious purpose. Well designed games that motivate players create an ideal learning environment. Games have rules and structure and goals that inspire motivation. Games are interactive and provide outcomes and feedback. Most games also have problem-solving situations that spark creativity.

The characteristics of educational games are as follows:

- Games are a form of fun, which give us enjoyment and pleasure.
- Games are a form of play, which require complete and passionate involvement.
- Games are guided by rules.
- Games require us to achieve certain goals, which give us motivation.
- Games are interactive.
- Games are adaptive.
- Games have outcomes and feedback, which help in the learning process.
- Games help us to win in a particular situation which boosts our self-esteem.
- Games have conflict/competition/challenge/opposition.
- Games help us in problem-solving, which in turn ignites our creativity.
- Games help us to interact within social groups.
- Games have representation and story.

Games encourage active learning, interaction between various people, team work, and also provide a free environment that allows for skill enhancement. Game-based learning provides versatility for more than one learning style, and also can affect cognitive and psychomotor skills. While learning through games can be very effective, they can become a distraction, causing them to become too focused on the game and not on learning.

According to the 2010 Horizon Report, through games students experience the struggles and successes of collaboratively working towards a solution to a complex problem set within an interesting storyline. It also points out that although games have been a staple in classrooms for years, '… they are single-

player or turn-based rather than truly collaborative.' According to this report there are three types of educational gaming:

- Games that are not digital
- Games that are digital, but that are not collaborative
- Collaborative digital games

Before deciding on the method of game-based learning, the teacher must prioritize the things that the students need to learn. If a trainer does not determine the objective of the training session, he may be in a condition of using a game that does not connect with the learners. To prevent this, the teacher needs to select the gaming material depending on the following factors:

- Age group
- Familiarity
- Educational pre-text

For instance, gathering ideas from children early in the design process yields useful insights into what children want in technology in general or in a specific type of application.

### 3.7.2 Merits and Demerits of Educational Games

**Merits**

- Serious games create a hands-on, minds-on opportunity that allows players to actively focus, create and change a scenario while simultaneously learning about consequences of choice in the situation.
- Players develop the interest to learn more about the topic so that they are able to solve the problem.
- Educational games allow students to become active participants in generating innovative ideas, information and solutions to problems while also allowing them to feel the tension and suspense of the crisis situation.
- Playing educational games also helps to increase focus, self-esteem, and improve the memory.
- Students can work on multiple skills and subjects across the curriculum at once.

**Demerits**

- Games do not fit very well on a time table. It is hard to estimate how much time it will take a student to accomplish sub-goals and ultimately finish a game, which can present a problem for teachers wanting to outline how long classroom units should take.

- Because each group plays their own game, it is likely that they come up with a completely different experience from someone playing the same game, but making different decisions.
- If each student is learning and experiencing something different, teachers will have a hard time keeping account of who has learned what.
- There is always a chance of over-use. This means that when students and teachers begin to rely too heavily on the use of video games to learn or review material, they risk losing the skills that allow them to function outside of a digital source.
- Social interaction must be physical as well as mental and this is one of the shortfalls of educational gaming without classroom interaction.

### Check Your Progress-6

1. Define educational games.

   _____

   _____

2. Mention the broad categories into which the educational games are divided.

   _____

   _____

3. What are the factors which determine the selection of an educational game?

   _____

   _____

## 3.8 Let Us Sum Up

- Teaching methods help a teacher to decide how he should teach his students. In the absence of a proper method, the student cannot be given correct knowledge.
- Lecture means teaching a lesson in the form of speech or talk. The teacher delivers a lecture for a particular topic and the students keep listening in an idle manner. The teacher can precisely determine the aim, content, organization, pace and direction of teaching.

- Teachers participating in the team teaching decide or determine the activities themselves. Thus, team teaching is a well-organized system of teaching in which many teachers impart instructions to a group of students in a cooperative manner.
- The method of team teaching originates from different sources. Three of the sources are: from a single department, from various departments of a single institution and from a single department of various institutions.
- The procedure of team teaching involves planning, organization and evaluation of the results.
- Seminar is an instructional technique of higher learning which involves paper reading on a theme followed by the group discussion to clarify the complex aspects of the theme.
- Two types of objectives of a seminar are cognitive and psychological.
- Different roles played by individuals in a seminar are that of an organizer, president, speakers, participants and observers.
- Tutorial is a session of intensive instruction by a tutor. It is a system of education in which instructions are given by tutor (teacher) who also acts as a general advisor.
- In the tutorial method of teaching, the class is divided into small groups, the teacher goes to these groups and tries to locate their problems and helps them find the correct solutions.
- Three types of tutorial are supervised, group and practical tutorial.
- Brainstorming strategy is a problem-oriented strategy of teaching.
- Fundamental rules of a brainstorming session are: no criticism, welcome unusual ideas, quantity wanted and combine and improve ideas.
- Educational games are defined as individual or group games that have cognitive, social, behavioural and/or emotional dimensions which are related to educational objectives.
- The different types of educational games include board games, card games and video games.

## 3.9 Key Words

- **Lecture:** It means teaching a lesson in the form of speech or talk.
- **Team teaching:** An instructional situation where two or more teachers possessing complementary teaching skills cooperatively plan and

implement the instruction for a single group of students using flexible scheduling and grouping techniques to meet the particular instruction.

- **Planning:** It is the process of thinking about and organizing the activities required to achieve a desired goal.
- **Organization:** It a social entity that has a collective goal and is linked to an external environment.
- **Evaluation:** It is a systematic determination of a subject's merit, worth and significance, using criteria governed by a set of standards.
- **Seminar:** It is an instructional technique of higher learning which involves paper reading on a theme followed by the group discussion to clarify the complex aspects of the theme.
- **Cognition:** It is a group of mental processes that includes attention, memory, producing and understanding language, learning, reasoning, problem solving, and decision making.
- **Psychology:** It is an academic and applied discipline that involves the scientific study of mental functions and behaviours.
- **Tutorial:** It is a session of intensive instruction by a tutor. It is a system of education in which instructions are given by tutor (teacher) who also acts as a general advisor.
- **Brainstorming strategy:** It refers to a group or individual creativity technique with the help of which a conclusion or solution for a specific problem can be found out by amalgamating a list of ideas spontaneously contributed by its members.
- **Educational games:** These are individual or group games that have cognitive, social, behavioural and/or emotional dimensions which are related to educational objectives.

## 3.10 Terminal Questions

1. Explain lecture method of teaching along with its characteristics, merits and demerits.
2. What are the objectives and principles of a team teaching method? Explain.
3. Discuss in brief the different types of team teaching methods.
4. Describe the various steps involved in the method of team teaching.
5. List the merits and demerits of team teaching.
6. Discuss the various roles played by individuals in a seminar. Also elaborate upon the whole procedure of how a seminar is conducted.

7. What are the advantages and disadvantages of tutorial method? How can we make learning through tutorial method more effective and fruitful?
8. Explain the fundamental rules of brainstorming strategy and also the steps involved in it.
9. List the merits and demerits of a brainstorming strategy.
10. What are educational games? List out the characteristics of an educational game.

## 3.11 Suggested Reading

Gee, J.P. *What Video Games Have to Teach Us About Learning and Literacy*. Palgrave Macmillan, 2003.

Frost, J., Wortham, S., and Reifel, S. *Play and Child Development*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall, 2008.

Das, B.C. *Educational Technology*. New Delhi: Kalyani Publishers, 1999.

Das, R.C. *Educational Technology*, New Delhi: Sterling Publishers, 1993.

## 3.12 Model Answers to 'Check Your Progress'

**Check Your Progress-1**

1. Lecture method is easy, brief and attractive for the teacher.
2. The main disadvantage of lecture method is that it only allows one-way communication.

**Check Your Progress-2**

1. Carlo Olson defines team teaching as an instructional situation where two or more teachers possessing complementary teaching skills cooperatively plan and implement the instruction for a single group of students using flexible scheduling and grouping techniques to meet the particular instruction.
2. Team teaching is based on cooperation without which the very idea of this teaching method will fail.
3. The objectives of team teaching are as follows:
   - To make classroom teaching effective according to the interests and capacities of the pupils

- To encourage flexibility in grouping the pupils. In this, the grouping of the pupils in a subject is done according to the interests and aptitudes of the pupils
- To increase the quality of the instruction.

**Check Your Progress-3**

1. Seminar is an instructional technique of higher learning which involves paper reading on a theme followed by the group discussion to clarify the complex aspects of the theme.
2. The two main objectives of a seminar method are as follows:
   (i) Cognitive objectives
   (ii) Psychological objectives
3. The various types of seminars are as follows:
   (i) Mini seminar
   (ii) Main seminar
   (iii) National seminar
   (iv) International seminar

**Check Your Progress-4**

1. Tutorial method is a session of intensive instruction by a tutor. It is a system of education in which instructions are given by the tutor (teacher) who also acts as a general advisor.
2. The three types of tutorial methods are: supervised tutorial, group tutorial and practical tutorial.

**Check Your Progress-5**

1. In general terms, brainstorming strategy refers to a group or individual creativity technique with the help of which a conclusion or solution for a specific problem can be found out by amalgamating a list of ideas spontaneously contributed by its members.
2. The principle characteristics of a brainstorming strategy are as follows:
   - It is a completely permissive style of teaching strategy.
   - It is based upon an assumption that a student can learn better in a group rather than in isolation.
   - It is a problem-oriented strategy of teaching.

**Check Your Progress-6**

1. Educational games are defined as individual or group games that have cognitive, social, behavioural and/or emotional dimensions which are related to educational objectives.
2. The three different categories of educational games include the following:
   - Board games
   - Card games
   - Video games
3. The factors which determine the selection of an educational game are as follows:
   - Age group
   - Familiarity
   - Educational pre-text