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MAE 203: EDUCATIONAL TECHNOLOGY

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CENTRE FOR DISTANCE AND ONLINE EDUCATION

UNIVERSITY OF SCIENCE & TECHNOLOGY MEGHALAYA

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Techno City, 9th Mile, Baridua, Ri-Bhoi, Meghalaya, 793101

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MAE 203

Educational Technology

Introduction: Educational Technology is an essential field that integrates modern tools and strategies to enhance the educational process. It encompasses a wide range of practices, including the use of digital resources, pedagogical innovations, and data-driven approaches to improve teaching and learning. This course aims to equip students with a comprehensive understanding of the concepts, scope, and objectives of Educational Technology, preparing them for effective application in diverse educational settings.

Chapter 1: Educational Technology and its Basic Aspects

This chapter explores the foundational concepts and scope of Educational Technology. Students will learn about its objectives and significance in contemporary education. The chapter delves into the evolution of educational practices with technological advancements, examining how these tools facilitate improved learning outcomes. Key topics include the historical context, definitions, and theoretical underpinnings that shape Educational Technology today.

Chapter 2: Communication and Instruction

Focusing on the role of communication in education, this chapter examines various instructional techniques and their effectiveness. Students will explore the communication process, the use of teaching aids, and the system approach to designing instructional experiences. The integration of computer and internet resources is also discussed, highlighting how digital tools can enhance the interaction between educators and learners, making learning more dynamic and engaging.

Chapter 3: Teaching Levels, Strategies, and Models

In this chapter, students will investigate different levels of teaching, from basic to advanced, and the strategies employed at each stage. Various teaching models are analyzed, providing insight into their application in real-world classroom settings. The chapter emphasizes the importance of adapting teaching methods to suit different learning needs and environments, ensuring that educational experiences are tailored to maximize student engagement and comprehension.

Chapter 4: Programmed Instruction

Programmed Instruction is a key component of Educational Technology, focusing on individualized learning through structured materials. This chapter outlines the principles and methods of programmed instruction, including linear and branching programs. Students will learn how to design and implement these instructional techniques to promote self-paced learning, thereby catering to the diverse needs of students and enhancing their educational outcomes.

Unit I
Educational Technology and its basic aspects

Unit Structure

1.0 Learning Objectives

- ✓ To understand and articulate the meaning and key concepts of educational technology.
- ✓ To identify and explain the various areas where educational technology can be applied within the educational system.
- ✓ To analyze the importance of educational technology in enhancing teaching and learning processes.
- ✓ To distinguish between the hardware and software components of educational technology and describe their roles.
- ✓ To compare and contrast educational technology and instructional technology, highlighting their unique features and applications.

1.1 Introduction

In today's technological era, we utilize scientific techniques to solve problems and enhance our lives. Education is no exception, as we implement technology to make teaching and learning easier, more straightforward, and comprehensive. This field, known as educational technology, saves time and energy while supporting learners' progress.

As the first unit of this course, we aim to provide a comprehensive understanding of the meaning, scope, significance, and components of educational technology.

1.2 Meaning of Educational Technology

Education as a broad discipline that is responsible for changing behavior of individual with the help of suitable method, strategies and techniques of teaching and learning. From the time of traditional Guru Shisya parampra till date drastic changes have been observed in this regard. In this modern era of 21st century of science and technology the complex process of teaching learning has been modified and simplified by the use of educational technology which is nothing but application of modern technology in the field of educational process. You can understand the meaning of educational technology by dividing it into two words ―education‖ and ―technology‖: Education is the process of acquiring and imparting cognitive, affective, psychomotor development on the part of the learner with a suitable strategy. Education is a discipline which is both science and art. It is a mixture of science of learning and arty of teaching. However technology refers to the systematic application of scientific principles in terms of tools, machines and other expertise to achieve an objective which as a result of use can design and create new devices that enriches human productivity as well as solves the problems. Hence technology is applied for human development and worked as a problem solving inventions.

Technology refers to the techniques as also the technical contrivances. A systematic way of applying the techniques to achieve an objective is as important as the use of technical equipment for the same. As a matter of fact, techniques are reckoned as the software and the equipment as the hardware of technology. Technology results in new designs and devices as also new ideas and processes. Each new physical device is accompanied by a new set of procedures and techniques. For example, the development of telephone has led to phone books, answering machines, fax, telephone shopping, etc. the ‗hard‘ component (physical device) for the purpose of study.

Educate the act or process of acquiring and imparting knowledge is crucial to the development of a learner with a view to his/her participation in the transformation of the world for a better tomorrow. Learning and understanding are basic to the definition of education.

Educational technology is not a simple combination of these two words as shown in fig. its is usually thought of even more than the sum of the following two interpretation;

I. Technology in education

II. Technology of education

Early developments referred to the role of technology in education which signifies the use of audiovisual equipment, i.e., hardware in educational processes. Later developments recognize the concept of technology of education, i.e., techniques and methodologies of the teaching learning process. This is indeed the software aspect of educational technology. The origin of software is closely associated with the courseware, i.e., instructional design and development of a subject.

Thus Educational technology is a science of techniques and methods by which educational goals can be realized. . It is helpful for preserving, transmitting and advancing the knowledge utilizing suitable tools and techniques such as computer, television, CD etc. Hence educational technology utilizes several machines such as television, radio, tape recorder, video tapes with principles engineering and principles of physical sciences and behavioral science for improving the teaching and learning process of education.

Educational technology deals with

(i) Analyze instructional tasks and challenges to set educational objectives.

(ii) Select and construct suitable machines, tools, and instruments.

(iii) Choose and use appropriate techniques to operate devices and achieve educational objectives.

(iv) Integrate scientific and technological skills with desired behavioral outcomes.

Over time, many definitions of educational technology have been developed to enhance our understanding:

National Council for Educational Technology (UK, 1967):

Educational technology involves the development, application, and evaluation of systems, techniques, and aids to improve human learning.

Derik Unwin (1969):

It is the application of modern skills and techniques to meet the requirements of education and training.

Leith (1975):

Educational technology applies scientific knowledge about learning and conditions to improve the effectiveness and efficiency of teaching and learning.

Robert A. Cox:

Educational technology is the application of scientific processes to learning conditions.

John P. DeCecco:

It is the detailed application of the psychology of learning to practical teaching problems.

E.E. Hadden:

Educational technology focuses on the design and use of messages that control the learning process.

Richmond:

It provides appropriately designed learning situations to achieve the objectives of teaching or training.

S.S. Kulkarni:

Defined as applying scientific laws and discoveries to the educational process.

S.K. Mitra:

Conceived as a science of techniques and methods to realize educational goals.

Robert A. Cox (1970):

Educational technology applies scientific processes to learning conditions, also known as 'instructional' technology.

D.E.S. Working Party (UK):

It involves developing, applying, and evaluating systems, techniques, and aids in human learning.

Robert M. Gagne:

It is the development of systematic techniques and practical knowledge for designing, testing, and operating educational systems.

Richey (2008):

Educational technology effectively uses technological tools in learning, encompassing media, machines, and networking hardware. It includes applications and processes such as audio/video tape, satellite TV, CD-ROM, computer-based learning, intranet/extranet, and web-based learning.

Tavangarian, Leypold, Nölting, Röser (2004):

Educational technology includes media that deliver text, audio, images, animation, and streaming video, supporting e-learning processes through information and communication systems.

Association for Educational Communications and Technology (AECT):

Instructional technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning.

UNESCO:

Educational technology is a communication process resulting from applying scientific methods to the behavioral science of teaching and learning, which may involve media like television, radio, and cassettes.

Check your progress

1. What the meaning of Educational Technology?
2. What are the two main aspects of educational technology?
3. What is the focus of educational technology as a subject in courses?
4. Name one function of educational technology.
5. According to UNESCO, what does educational technology involve?

1.2 Scope of Educational Technology

Educational technology involves using physical hardware and educational theories. It spans various domains, including learning theory, computer-based training, online learning, and mobile learning (m-learning). Here are the key aspects of educational technology:

- Educational Technology as Theory and Practice: Focuses on educational approaches to learning.
- Technological Tools and Media: Assists in the communication, development, and exchange of knowledge.
- Learning Management Systems (LMS): Includes tools for managing students, curricula, and educational management information systems (EMIS).
- Educational Technology as a Subject: Courses may be titled "Computer Studies" or "Information and Communication Technology (ICT)."

Educational technology enhances teaching, learning, testing, and training activities, helping achieve educational goals.

1.4 Significance of Educational Technology

- **Access to variety of learning resources:** In the era of technology. ET aids plenty of resources to enhance the teaching skills and learning ability. With the help of ET now it is easy to provide audio visual education. The learning resources are being widens and widen. Now with this vivid and vast technique as part of the ET curriculum, learners are encouraged to regard computers as tools to be used in all aspects of their studies. In particular, they need to make use of the new multimedia technologies to communicate ideas, describe projects, and order information in their work.

- **Immediacy to information:** ET has provided immediacy to education. Now in the year of computers and web networks the pace of imparting knowledge is very fast and one can be educated

anywhere at any time. New IT has often been introduced into well-established patterns of working and living without radically altering them. For example, the traditional office, with secretaries working at keyboards and notes being written on paper and manually exchanged, has remained remarkably stable, even if personal computers have replaced typewriters.

- **Any time learning:** Now in the year of computers and web networks the pace of imparting knowledge is very fast and one can be educated .One can study whenever he wills irrespective of whether it is day or night and irrespective of being in India or in US because of the boom in ET.

- **Collaborative learning:** Now ET has made it easy to study as well as teach in groups or in clusters. With online we can be unite together to do the desired task. Efficient postal systems, the telephone (fixed and mobile), and various recording and playback systems based on computer technology all have a part to play in educational broadcasting in the new millennium. The Internet and its Web sites are now familiar to many children in developed countries and among educational elites elsewhere, but it remains of little significance to very many more, who lack the most basic means for subsistence.

- **Multimedia approach to education:** Audio-Visual Education, planning, preparation, and use of devices and materials that involve sight, sound, or both, for educational purposes. Among the devices used are still and motion pictures, filmstrips, television, transparencies, audiotapes, records, teaching machines, computers, and videodiscs. The growth of audio-visual education has reflected developments in both technology and learning theory. Studies in the psychology of learning suggest that the use of audio- visuals in education has several advantages. All learning is based on perception, the process by which the senses gain information from the environment. The higher processes of memory and concept formation cannot occur without prior perception. People can attend to only a limited amount of information at a time; their selection and perception of information is influenced by past experiences. Researchers have found that, other conditions being equal, more information is taken in if it is received simultaneously in two modalities (vision and hearing, for example) rather than in a single modality. Furthermore, learning is enhanced when material is organized and that organization is evident to the student. These findings suggest the value of audio-visuals in the educational process. They can facilitate perception of the most important features, can be carefully organized, and can require the student to use more than one modality.

- **Authentic and up to date information:** The information and data which are available on the net is purely correct and up to date. Internet, a collection of computer networks that operate to common standards and enable the computers and the programs they run to communicate directly provides true and correct information.

- **Online library:** Internets support thousands of different kinds of operational and experimental services one of which is online library. We can get plenty of data on this online library. As part of the IT curriculum, learners are encouraged to regard computers as tools to be used in all aspects of their studies. In particular, they need to make use of the new multimedia technologies to

communicate ideas, describe projects, and order information in their work. This requires them to select the medium best suited to conveying their message, to structure information in a hierarchical manner, and to link together information to produce a multidimensional document.

- **Distance learning:** Distance Learning, method of learning at a distance rather than in a classroom. Late 20th-century communications technologies, in their most recent phases multimedia and interactive, open up new possibilities, both individual and institutional, for an unprecedented expansion of home-based learning, much of it part-time. The term distance learning was coined within the context of a continuing communications revolution, largely replacing a hitherto confusing mixed nomenclature—home study, independent study, external study, and, most common, though restricted in pedagogic means, correspondence study. The convergence of increased demand for access to educational facilities and innovative communications technology has been increasingly exploited in face of criticisms that distance learning is an inadequate substitute for learning alongside others in formal institutions. A powerful incentive has been reduced costs per student. At the same time, students studying at home themselves save on travel time and other costs. Whatever the reasoning, distance learning widens access for students unable for whatever reason (course availability, geographical remoteness, family circumstances, individual disability) to study alongside others. At the same time, it appeals to students who prefer learning at home. In addition, it appeals to organizers of professional and business education, providing an incentive to rethink the most effective way of communicating vital information.

- **Better accesses to children with disabilities:** Information technology has brought drastic changes in the life of disabled children. ET provides various software and technique to educate these poor peoples. Unless provided early with special training, people profoundly deaf from birth are incapable of learning to speak. Deafness from birth causes severe sensory deprivation, which can seriously affect a person's intellectual capacity or ability to learn. A child who sustains a hearing loss early in life may lack the language stimulation experienced by children who can hear. The critical period for neurological plasticity is up to age seven. Failure of acoustic sensory input during this period results in failure of formation of synaptic connections and, possibly, an irremediable situation for the child. A delay in learning language may cause a deaf child's academic progress to be slower than that of hearing children. The academic lag tends to be cumulative, so that a deaf adolescent may be four or more academic years behind his or her hearing peers. Deaf children who receive early language stimulation through sign language, however, generally achieve academically alongside their hearing peers.

The integration of information technology in teaching is a central matter in ensuring quality in the educational system. There are two equally important reasons for integrating information technology in teaching. Pupils must become familiar with the use of information technology, since all jobs in the society of the future will be dependent on it, and information technology must be used in teaching in order to improve its quality and make it more effective.

Specific Significance

- access to variety of learning resources
- immediacy to information
- anytime learning
- anywhere learning
- collaborative learning
- multimedia approach to education
- authentic and up to date information
- access to online libraries
- teaching of different subjects made interesting
- educational data storage
- distance education
- access to the source of information
- multiple communication channels-e-mail, chat, forum, blogs etc.
- access to open courseware
- better accesses to children with disabilities
- reduces time on many routine tasks

Check your progress

6. What is one benefit of educational technology regarding learning resources?
7. How does educational technology support students with disabilities?
8. What is one advantage of multimedia approaches in education?

1.5 Components of ET

The educational technology composed of mainly two components such as hardware and software. Both hardware and software is equally important for effective application of educational technology. For example an interactive computer programme is worthless without suitable educational programme. Both hardware and software are complementary to each other.

1.5.1 Hardware

Hardware denotes technology in education that involoves electronic devices based on scientific principles and techniques.Its origin is in Physical Sciences & Applied Engineering and it is based on the concept of Service. It adopts a Product-oriented Approach.It is concerned with the production and utilization of audio-visual aid material[such as charts, models, slides, filmstrips, audio cassettes, etc.], sophisticated instruments and gadgets[such as radio, television, films, projectors, tape-recorders, video player, teaching machines , computers, etc.] and mass media. Hardware Technology utilizes the products of Software Technology [such as teaching strategies, teaching learning material, etc.] for its functioning. Hardware technology has the potential to hand over the educational benefits to the mass with greater ease and economy Too much use of technical gadgets may mechanize the process of teaching-learning as the Hardware approach tries to enter education from outside, operating more in isolation than in combination.

1.5.2 Software

Software denotes technology of education which involves a systematic, scientific application of appropriate scientific research both from physical science, social science such as psychology and sociology, philosophy, management studies etc. to solve educational problems. It is sometimes referred to as Teaching Technology, Instructional Technology or Behavior Technology. Its origin is in Behavioral Sciences and the applied aspects of Psychology of learning. It is a Process-oriented Approach. It utilizes the knowledge of the Psychology of Learning to produce learning material, teaching – learning strategies, etc.[Software Technology] for the betterment of the process of teaching-learning It does not provide direct services to its users. Instead, it helps in the production of various Software materials which are used for developing the hardware appliances. It includes teaching strategies, learning material, evaluation tools, teaching models, programmed instruction, etc. Software technology does not require any aid form the hardware technology for its delivery. It becomes more useful and productive when assisted by the Hardware Technology. Software technology does not have mass appeal and is costlier in the long run, as compared to hardware technology.

1.6 Educational Technology and Instructional Technology

The terms educational technology and instructional technology may seem interchangeable, but they in fact have important subtle differences, when understood can make the differences to an educator(s) planning and implementation of instruction. The analysis between educational technology and instruction technology are in fact found at the roots of their definitions.

Education is defined as the "activities and resources that support learning" (AECT, 2004, p.1). This refers to all activities and resources both planned and unplanned that contribute to a students' learning regardless of whether the learning is intentional or unintentional. On the other hand , instruction refers to " activity structured by someone other than the learner and oriented toward specific ends"(AECT, 2004,p.1). Instruction is part of the education as a whole but instruction, unlike education, is carefully mapped out in every detail.

Educational technology is defined as "the study and ethical practice of facilitating learning and improving performance by creating using, and managing, appropriate technological processes and resources" (AECT. 2004. p.3). The application of theory, technology, and psychology to achieve the goal of education and enhance the learning of individuals is nothing bur educational technology.

Educational technology

- Is responsible for Development of teaching and learning
- Applies theories of instruction, learning, behavioral and cognitive psychology to assessment, design, implementation, and evaluation of instructional material.
- Applies research, theory, technologies, and psychology to solve instructional and performance problems.
- The particular approach used to achieve the ends of education.

Educational technologist

- Design instruction
- Produce instructional materials
- Manage instructional computing services or learning resources collections.
- Apply theories of cognition and research to utilize technology for the benefit of the learner.

Instructional Technology: IT is defined as "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Seels and Richey, 1994, p.1). It specifically refers to using technological processes as tools to enhance teaching and learning by facilitating access to various types of information. This broad term encompasses the acquisition, processing, storage, and dissemination of information, as well as the evaluation, management, and integration of instructional tools. Instructional technologists are responsible for identifying and analyzing instructional design problems, devising and implementing solutions, and integrating people, procedures, ideas, and devices to improve the learning process. Although Instructional Technology and Educational Technology may seem synonymous, the key difference is that Instructional Technology focuses on the tools themselves, whereas Educational Technology refers to the methodologies for employing these tools effectively.

Contrast the characteristics of educational technology and Instructional technology:

Educational	Instructional
Teaches about technology as a content area	Teaches with technology (uses technology as a tool)
Key words: integration and education	Key words: learning environments, instructional systems and process
Shape curriculum or solve performance	Focus more on the development and creating of the learning system that involve some type of technology
Primary Goal: Technological literacy for everyone	Primary Goal: To enhance the teaching and learning process
Concerned with the broad spectrum of technology (How humans have designed and innovated the natural world)	Primarily concerned with the narrow spectrum of information and communication technologies

❖ Check your progress

9. What are the two main components of educational technology?

10. What does hardware in educational technology include?
11. What is the main difference between educational technology and instructional technology?
12. What role does an instructional technologist play?

1.7 Let us Sum up

In this unit, we delved into the concept of educational technology, uncovering its scope and importance. We took a closer look at both hardware and software components, stressing how crucial it is for educational technology to develop with high quality to support widespread use across the country. We also clarified the difference between educational technology and instructional technology, shedding light on their unique roles and applications. Grasping these concepts is key to using educational technology effectively, helping us enhance learning experiences and tackle educational challenges more effectively.

1.8 Further Reading

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1.9 Answer to check your progress

1. Educational technology is a science of techniques and methods by which educational goals can be realized.
2. (a)Technology in education (b) Technology of education.
3. Courses may be titled "Computer Studies" or "Information and Communication Technology (ICT)."
4. Acquisition, processing, storage, and dissemination of information.
5. Applying scientific methods to the behavioral science of teaching and learning.
6. Educational technology provides access to a variety of learning resources.
7. It provides specialized software and techniques to aid in their education.
8. They enhance learning by using sight and sound to present information.
9. Hardware and software.
10. Electronic devices such as computers, projectors, and audio-visual aids.
11. Educational technology refers to methodologies for using tools, while instructional technology focuses on the tools themselves.

12. They identify instructional design problems, devise solutions, and integrate tools to enhance the learning process.

1.10 Model Questions

1. Explain the concept of educational technology, including its components and significance. How does it enhance the teaching and learning process?
2. Discuss the role and impact of hardware technology in educational settings. Provide examples of how hardware components are utilized in modern education.
3. Define software technology in the context of education. How does it differ from hardware technology, and what role does it play in the educational process?
4. Differentiate between educational technology and instructional technology. How do these terms relate to each other, and what are their distinct roles?
5. Discuss the significance of immediate access to information through educational technology. How has this changed the traditional educational landscape?
6. How does educational technology support collaborative learning? Provide examples of tools and methods that enable group work and interaction among learners.
7. Explain the concept of multimedia education and its advantages. How does the integration of multimedia enhance the learning process?
8. Describe how educational technology provides better access to children with disabilities. What are some examples of assistive technologies that aid in their education?
9. Discuss the role of online libraries in educational technology. How do online libraries enhance the research and learning experience for students?
10. What is distance learning, and how has it evolved with advancements in educational technology? Discuss its benefits and challenges.
11. Explain the significance of authentic and up-to-date information in educational technology. How does it impact the quality of education?
12. Compare and contrast the roles of educational technologists and instructional technologists. How do their responsibilities differ in the context of educational technology?

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Unit 2
Communication and Instruction

Unit Structure

2.0 Learning Objectives

- ✓ To understand the basic concept of communication and its significance in the educational context.
- ✓ To explore various theories of communication and their implications for instructional strategies.
- ✓ To analyze the nature and components of communication, including verbal and non-verbal elements.
- ✓ To examine different types of communication and their effectiveness in classroom settings.
- ✓ To evaluate the role of mass media in educational technology and its impact on learning.

- ✓ To design an instructional system and formulate clear instructional objectives through task analysis.

2.1 Introduction

In the previous unit we got an idea about educational technology and its significance as well as its components. We found that educational technology can help the teacher and taught to communicate in spite of distance and other obstacles. But if this communication or interaction would not be appropriate it could spoil the whole attempt. Thus the way of communication has a great importance in our life as well as in the process of teaching learning. This present chapter will deal with the concept of communication.

2.2 Concept of Communication

Communication is considered as the act of transfer. It is the art and technique of using words effectively to impart information or ideas. Communication is the field of study concerned with the transmission of information by various means, such as print or broadcasting. Communication is concern with the technology to transmit messages. Communication is sending and receiving information between two or more people. The person sending the message is referred to as the sender, while the person receiving the information is called the receiver. The information conveyed can include facts, ideas, concepts, opinions, beliefs, attitudes, instructions and even emotions. Communication is a skill acquired by an individual to exchange messages, facts, ideas, opinions and even express emotions. Communication means transferring thoughts, information, emotion and ideas through gesture, voice, symbols, signs and expressions from one person to another. The word communication came from the Latin word ―communis‖ that denotes ―to make common‖. It involves sharing of idea and thoughts.

Attempts have been made by different authors to define communication. A few are enumerated below:

―Communication is the process of passing information and understanding from one person to another‖ – Keith Davis

―Communication is the process of transmitting information from one person to another‖. – Ricky W. Griffin

. ―Communication is the intercourse by words, letters or messages, intercourse of thoughts or opinions. It is the act of making one‟s ideas and opinions known to other‖. – Fred G. Meyer.

―Communication means to share in, to give to another or the interchange of – thoughts, opinions or information.‖ Webster

―Communication is an exchange of facts, ideas, opinions, or emotions by two or more persons.‖

W. H. Newman and C. F. Summer Jr.

—Communication in its simplest form is conveying of information from one person to another.‖ Hudson

—Communication is the process of passing information and understanding from one person to another.‖ Keith Davis

—Communication is a continuing and thinking process dealing with the transmission and interchange with understanding of ideas, facts and courses of action.‖ George R. Terry

—Communication is the transmission of information, ideas, emotions, skills, etc. by the use of symbols, words, pictures, figures, graphs, etc. It is the act or process of transformation that is usually called communication. ‖ Berelso and Steiner

Communication maintains and animates life. It creates a common pool of ideas, strengthens the feeling of togetherness through exchange of messages and translates thought into action.‖ UNESCO – Many Voices One World.

2.3 Nature of Communication

Communication is natural phenomena in living world where individual transmit meaningful messages. Animals produce unique sounds to communicate whereas human beings verbal and nonverbal language to express their feelings and emotion. However communication has unique characteristics or nature. Those characters are as follows

(i) Interchange of information: The basic characteristic of human communication is that it aims at exchanging information. It is a two-way process. The exchange can be between two or more persons. It may be at the individual or the organizational level.

(ii) Continuous process: Communication is a continuous process. It is not static. It is constantly subject to change and is dynamic. The people with whom communication is held, its content and nature, and the situation in which communication is held – all keep changing.

(iii) Mutual understanding: The main purpose of communication is to bring about mutual understanding. The receiver should receive and understand the message in the manner that the sender intended him to.

(iv) Response or reaction: Communication always leads to some response or reaction. A message becomes communication only when the receiving party understands and acknowledges it, and also reacts and responds to it.

(v) Universal function: Communication is a universal function, which covers all levels of authority.

(vi) Social activity: Communication is a social activity, too. The components of a society are into a relationship of sharing, be it information, feelings or emotions. The same holds true for educational communication. It involves the effort of pupil and teacher to get in touch with one another and to make them understood. The process by which individuals attempt to share meaning and relate to one another is, thus, a social activity.

(vii) It involves at least two persons:

- It involves at least two persons, a sender and a receiver.
- The sender is called „communicator" and the receiver of the message is known as "communicate".
- A person who speaks, writes or issues some instructions is the "sender/communicator" and the person who receives the message is the "receiver/communicate".

(viii) In Communication messages is the must: A message is the subject-matter of communication, (eg.) the contents of the letter or speech, order, instructions or the suggestions. A communication must convey some message

(ix) Communication is written, oral or gestural

- It is generally understood as spoken or written words.
- But in reality communication is more than speaking and writing.
- It includes everything that may be used to convey meaning from one person to another. (eg) movement of lips, or the wink of an eye or the wave of hands.

(x) Communication is a two way process

- It involves both information and understanding.
- Communication is not complete unless the receiver has understood the message properly and his reaction or response is known to the sender.

(xi) Its primary purpose is to motivate a response: the primary purpose of communication is to motivate a response or influence human behaviour.

(xii) Communication is formal or informal

- Formal Communication follows the formal channels provided in the organization structure.

- Informal channels of communication which are not provided in the organization structure.
- These channels develop among members because of personal contacts through working with each other.

(xiii) Communication flows up and down and also from side to side: Communication flows downward from a superior to subordinates and upward from subordinate to a superior.

(xiv) Communication is an integral part of the process of exchange: It refers to the exchange of ideas, feelings, emotions and knowledge and information between two or more persons.

❖ **Check your progress**

1. What do you understand by communication?
2. What is the basic characteristic of human communication?
3. What is the primary purpose of communication?
4. What are the two types of communication channels mentioned?

2.4 Process of Communication

Three things are most important and essential in any communication process they are Sender, Receiver and the Channel (medium).The Sender is encoding the messages in any form like voice, written or any signs. So they often called as Encoder. The Receiver is decoding the message from the sender to understand the message. So they often called as Decoder. Any message or Information needs some channel or a medium. Example: television is an audio visual medium which decode the electronic signals into an audio-visual to the audience.

The process of communication involves seven major elements -sender, message, encoding, channel, receiver, decoding and feedback.

Sender:
The sender is the person who transmits a message. He is the communicator. He is the one who gets the entire process of communication started. He wants to get his opinions, ideas, facts, thoughts or information across to the receiver. He is, therefore, also said to be the transmitter of a message.

Message:
A message is the actual information that has to be conveyed. Communication is unthinkable without a message. A message triggers a response from the receiver. Messages can broadly

be divided into verbal and non-verbal. The message must be clear, complete, unambiguous and courteous.

Encoding:

The seeds of communication are sown the moment the sender thinks of transmitting a certain message. These thoughts have to be converted into suitable words, pictures, charts or symbols so that they can be delivered to the receiver.

This process of converting thoughts into suitable words, charts, symbols or any other form in which they can be understood by the receiver is called encoding. The choice of the method of communication is made here – will the message be verbal or non-verbal?

Channel:

How does one communicate? This is what a channel deals with. Communication is achieved through a channel. The channel can be a letter, an email, a fax, a telephone or memos, reports, bulletins, posters and manuals.

The choice depends on the relationship between the sender and the receiver as well as on the message that has to be communicated. Other factors that tend to influence the choice of a channel include the gravity of the message, the number of receivers, the costs involved and the amount of information.

Receiver:

The person who receives the message, decodes it and understands it or attaches some meaning to it is the receiver.

The receiver has to perform three functions:

(i) Reception of the message:

This is the stage when a message sent by the sender is sensorial taken in by the receiver.

(ii) Decoding the message:

After receiving the message, the receiver has to attach some meaning to it.

(iii) Understanding the message:

He then has to interpret it in the same way and in the same sense as the sender meant it.

Feedback:

The return of communication from the receiver to the sender is known as feedback. It is the response, reaction or reply to the communication. It is always directed towards the sender. This completes the cycle of communication. Thus, in feedback, the receiver sends his reply or response to the sender, indicating that he has understood the message received. In face-to-face communication

2.6 Components of Communication

Communication is a process of exchanging verbal and nonverbal messages. It is a continuous process. Pre-requisite of communication is a message. This message must be conveyed through some medium to the recipient. It is essential that this message must be understood by the recipient in same terms as intended by the sender. He must respond within a time frame. Thus, communication is a two way process and is incomplete without a feedback from the recipient to the sender on how well the message is understood by him.The main components of communication process are as follows:

1. **Context -** Communication is affected by the context in which it takes place. This context may be physical, social, chronological or cultural. Every communication proceeds with context. The sender chooses the message to communicate within a context.

2. **Sender / Encoder -** Sender / Encoder is a person who sends the message. A sender makes use of symbols (words or graphic or visual aids) to convey the message and produce the required response. For instance - a training manager conducting training for new batch of employees. Sender may be an individual or a group or an organization. The views, background, approach, skills, competencies, and knowledge of the sender have a great impact on the message. The verbal and nonverbal symbols chosen are essential in ascertaining interpretation of the message by the recipient in the same terms as intended by the sender.

3. **Message -** Message is a key idea that the sender wants to communicate. It is a sign that elicits the response of recipient. Communication process begins with deciding about the message to be conveyed. It must be ensured that the main objective of the message is clear.

4. **Medium -** Medium is a means used to exchange / transmit the message. The sender must choose an appropriate medium for transmitting the message else the message might not be conveyed to the desired recipients. The choice of appropriate medium of communication is essential for making the message effective and correctly interpreted by the recipient. This choice of communication medium varies depending upon the features of communication. For instance - Written medium is chosen when a message has to be conveyed to a small group of people, while an oral medium is chosen when spontaneous feedback is required from the recipient as misunderstandings are cleared then and there.

5. **Recipient / Decoder -** Recipient / Decoder is a person for whom the message is intended/ aimed / targeted. The degree to which the decoder understands the message is dependent upon various factors such as knowledge of recipient, their responsiveness to the message, and the reliance of encoder on decoder.

6. **Feedback -** Feedback is the main component of communication process as it permits the sender to analyze the efficacy of the message. It helps the sender in confirming the correct interpretations of messages by the decoder. Feedback may be verbal (through words) or non-verbal (in form of smiles, sighs, etc.). It may take written form also in form of memos, reports, etc.

❖ Check your progress

5. What are the three essential elements in the communication process?
6. What is the role of the Sender in communication?
7. What factors influence the choice of Communication Medium?

2.6 Types of Communication

Communication may be of the following types:

1. Oral Communication

- It takes place in face to face conversation, group discussions, etc. Spoken words are used to direct, instruct, and share experiences.

2. Written Communication

- Putting in writing includes letters, reports, notes etc. The written words are used to transmit one‟s expectations, likes and dislikes.

3. Vertical Communication

- Vertical communication is the one that flows both up and down the organization, usually along with formal reporting lines.

- It consists of two type namely upward communication & downward Communication.

I. **Upward Communication:** It consists of messages from subordinates to superiors. The message may be in the form of requests, responses, suggestions, complaints etc.

II. **Downward Communication:** It occurs when information flows down the hierarchy from superiors to subordinates. The message may be in the form of directions, assignments, performance, feedback etc.

4. Horizontal Communication

- This communication occurs among colleagues and peers of the same level in an organization.

5. Grapevine Communication

- In every organization, there is an informal channel of communication called the grapevine.
- It is quite natural for a group of people working together to be interested in one another and talk about appointments, promotions, retirements or even domestic affairs.
- The grapevine is basically a channel of horizontal communication because workers of the same status can informally communicate with one another with perfect ease.

6. Object Communication

- The most common form of object communication is clothing. Clothes determine one‟s personality traits. A good example of clothing as object communication is the uniform.
- Also the body adornments such as wedding rings, bindis as marital status, tatoos, and brands. Also, anything used a status symbol comes under the category of object communication.

7. Intra-Personal Communication

- This can be defined as a process through which one communicates with himself.
- This means the communication is within the self and to the self.
- For example, thinking, working out a problem, writing diaries, etc.

8. Inter-Personal Communication

- Inter-personal communication may be defined as a process of interaction between two people, generally face- to-face talk.
- For example, interaction between teacher and student in the classroom, a telephone conversation, interview etc.
- The emphasis is on speech, non-verbal forms of communication.

Difference between inter-personal and intra-personal communication:

Intra-personal communication takes place when a student, without the help from anyone, solves a mathematical problem. However Inter-personal communication occurs when his friend helps him in solving the same mathematical problem at every stage.

9. Group Communication

- It refers to the process of interaction within groups of people and by groups of people to others.
- The groups may be small or large.E.g. A family and committee meeting.

10. Mass Communication

Mass communication takes place when the communication is received by large number of people.

For example, open-air concert for a thousand people, radio and postal systems, etc.

Hence broadly there are 2 basic types of communications:

- Verbal Communication
- Non-Verbal Communication

Verbal Communication

The communication happens through verbally, vocally or through written words which express or convey the message to other is called verbal communication.

Example: Baby crying (vocal) is verbal communication which express the hungry or pain through vocally.

Verbal communication has two types

A. Oral Communication

B. Written Communication

- **A. Oral Communication:** A communication which happens through word of mouth, spoken words, conversations and also any messages or information are shared or exchanged between one another through speech or word of mouth is called oral communication. Example: Public speech, News reading, Television, Radio, telephone and mobile conversations.

- **B. Written Communication:** A communication happens through any word written or often written sign which refers the languages uses in any medium is called written communication. Example: Simply any hand written, typed, Newspaper, printed word documents, letters, books and magazines.

- **Non-Verbal Communication:** Any communication without word of mouth, spoken words, conversation and written languages are called Non-Verbal Communication. It happens through signs, symbols, colour, gestures, body language or any facial expressions are known as nonverbal communication. Traffic signals are one of the best examples for nonverbal communication.

❖ **Check your progress**

8. What is Vertical Communication?
9. Give an example of Non-Verbal Communication.

2.7 Classroom communication

In the process of teaching learning classroom communication has a great importance. As teaching is a two way process teacher and learner need to interact with each other to achieve the instructional objectives. In this regard you as a teacher must aware of effective communication pattern in a classroom situation. Similarly the students talk and their communication has very important role in making classs room learning more interactive. Teacher must motivate students to participate in talk, discussion, debate so that each student can express their doubts, queries, point of view without fear.

Communication Pattern of Teacher: When a teacher communicate inside the classroom it may be verbal or non verbal. Again s/he may speak or write verbally and sends messages to the learner regarding the lesson. Further by moving the body, head, shoulder, hand, gesture, facial expression also the communication is done non verbally. A teacher can implement several activities such as s/he may explain, derivate, demonstrate, recite to achieve the instructional goals and objectives utilizing proper communicational structure. Teacher‘s talk dependent on the context, theme of the subject matter, topic and instructional strategies, media, evaluation tools. Teacher should communicate inside the classroom without any ambiguity. Teacher can interact with the individual students, small group of students or large group of students.

The classroom communication should be well structured, purposive, positive and pragmatic by nature. That means the communication must have some type of objective or purpose or goal that should help the teacher to attain some objective. The communication should give rise to some positive result and it must be experiential or activity based. a teacher you should talk to your student raising their level of motivation, interest, curiosity. Further greater affinity, attraction, proximity should be created for the receiver. The message of classroom communication should be valid and accurate. As a teacher in classroom communication you should use following strategies:

(i) Simple and objective Language: That means teacher should use simple language , grammatically correct sentences, adequate vocabulary, to express the concept, thought so that it can be easily understood by the learners. Where possible state them in positive ways: for example, state explicitly what students have to do for each learning step; keep the language as simple as possible; use active verbs - eg 'look for this information', 'work in groups of three', 'write down only the key points' etc.

(ii) Checking for students’ Understanding: Teacher must repetitively check whether students have understood the instructional language or not to proceed further in content and avoid confusion.

(iii) Give instructions and information in small bite size 'chunks' If, for example, you want to explain that a learning activity consists of 4 separate steps, with some students you will need to explain step 1, get the students to do it, than explain step 2, and so on until the activity is complete. It's really important to give students these 'landmarks' to guide them through the learning, a bit like going from tree to tree through a forest.

(iv) Use a tone of voice that does not alienate students. It's very easy for teachers to slip into 'teacher mode' when they're talking, using a tone that doesn't sound natural to many students, or comes across as bombastic and hectoring. Let's be clear - teachers need to speak with authority and confidence but the tone of voice must be appropriate for communicating warmly and positively. Getting the right 'tone' is one of the most important steps in successful teacher student communication.

(v) Be careful not to talk for too long at a stretch. Most young people's attention span is roughly their chronological age plus or minus three or four. So if you're talking to a class of eleven year olds, the maximum length of time to talk in one go would be 14 or 15 minutes, but for some their attention may start to wander after eight minutes, or less, assuming there are no other distractions. A handy rule of thumb might be to think of talking for a minute or two less than the chronological age of the class, before getting students to then do something more active, or at least without having to listen attentively to the teacher talking. These are not hard and fast rules, and, as with other aspects of classroom life, so much depends on context and how well the teacher knows the class. Some expert teachers have developed their skill so that they limit all teacher talk to no more than 5 minute bursts.

(vi) Speak respectfully to students: All teachers know how hard this can be at times, when students themselves speak disrespectfully. It is nevertheless important to do everything possible to maintain a respectful tone, because promoting respect is one of the core principles of education, and we must, as teachers, try to take responsibility for modeling respect. It's also true that maintaining a respectful tone gives the teacher a better chance to remain in control.

(vii) Establish clear routines for who is allowed to talk, and when Some students are used to interrupting, often impulsively. Often this is not done as a deliberate attempt to disrupt the class, but it does, nevertheless, affect the flow of communication. You could use phrases such as, 'I'm pleased you've got a point to make, or want to ask a question, but I need to finish what I'm saying and I'll take your question in a minute. Is that OK?' Do it respectfully and most students will understand, but make sure you do give the student the opportunity to speak at the appropriate time. This is also a way of modeling that very often in the classroom only one person should speak at a time, and students need to learn to wait their turn to speak.

(viii) **Ask students to feed back to you, informally and respectfully**, how you come across when you talk. once worked with a colleague who had what she called her 'babble police' - selected students to whom she gave permission to tell her, when she'd been talking too long, or going off the point, and just not making sense. This can be a risky strategy for some teachers and you probably need to pick your class carefully. A small scale trial with a 'sympathetic' class might be worth considerng before rolling it out with all classes. You don't need to use it every lesson, but if you use it regularly and systematically, it could become a very powerful strategy to take your teacher student communication to another level.

(ix) **Use of technology in classroom makes learning more effective and alive.** Teacher may utilize OHP, television, radio, tape recorder, computer, internet technology to support learning of students and can send the messages to students through proper media and channels.

(x) **Proper planning and designing communicational attributes and classroom presentation** can help the teacher to convince the learner about the context. Before entering to classroom the communicational structure should be planned designed. The presentation should be associated with relevant picture, graphics. slides, graphs etc.

(xi) **Developing classroom culture** is another strategy for good classroom communication which should be democratic one and without any biasness and disharmony.

(xii) **Developing communication skills among the learner** plays crucial role for two , learner centric classroom situation. Activities like discussion, debate, brain storming can prompt learner to communicate.

(xiii) **Teacher must try best to create proper physical, social, psychological environment in classroom** for effective communication. Proper sitting arrangement, broad noise/barrier free, fear free and biasness free environment is essential for teacher – taught interaction. Further empathy or—feeling oneness‖ emotion in language should be inserted in form of —we‖ —our‖ etc words. Instant appreciation and patience can make classroom situation more lively and vibrant for communication.

❖ **Check your progress**

10. What are two types of classroom communication patterns for a teacher?
11. What is one way a teacher can maintain students' attention during a lecture?
12. What is a recommended strategy for checking students' understanding?

2.8 Mass media approach in E.T:

Mass media is the tool of science and technology that can convey loads of information to larger section of people within short time span. For example newspaper, TV, radio, internet etc. However now a days this mass media technology is utilized for educational purposes. Hence educational technology has been flourished with mass media approach. Mass media have proved to help in classifying concepts, stimulating group and individual activities, developing a collective critical awareness, changing attitudes, imposing a new structure or organisation on certain subjects and encouraging originality and creativeness. Therefore, teachers have to be properly motivated and made interested in the use of such materials. And they have also to be trained and oriented in the adequate use and maintenance of the materials.

There are a good number of media for mass communication such as radio, Television, newspapers and films etc. Previously, the mass media in the form of illustrative were only put to marginal and individualized use. There was neither any coherent thinking nor a scientific organisation of these materials in the educational process. But their increased use has been mainly due to interest and initiative of certain teachers.

The media of communication is the medium by which a piece of information or knowledge is communicated to us. This medium is the message, which is of greater importance. Because, the same piece of information when conveyed on a printed page or over the telephone by radio, or television will appear different and have entirely a different effect on us. Hence the effectiveness of a piece of information depends upon the medium through which it is imparted. Thus, the mass-media are not only the messages, but also the massage. Because, it massages the sensory organs and stimulates them to respond actively. Hence, the mass media is very important for class room teaching as a part of the process of instruction. The sole objective is to improve the teaching-learning process with the use of various media. Therefore, the main purpose of mass-media in education is to benefit more students with fewer teachers or to obtain quality education. In fact, the mass media have become a well of message around the world of today and have entered into all the structures of daily life, h can be used and in fact is being used as a means of education. So the role of mass media in education is gaining importance every day.

Importance of Mass Media:

1. Mass Media provide information to the mass within a less time.

2. It takes a wide coverage of information regarding anything that is happening in any comer of the world.

3. It brings the entire world to the individual or to the classroom. Children spend hours together sitting in front of the television and can visualize, hear and acquire knowledge about the world.

4. These media easily reach groups, allow repeated use, give more reality, influence attitudes, show cause and effect relationships and ultimately motivate the audience.

5. It sends information to remote places and helps in distant learning.

6. It helps in modification of attitudes, inculcation of desirable values and acquaintance with cultural heritage.

7. Mass media acts as an agency of social change.

8. Mass media are useful for reinforcing group dynamics and interpersonal communication.

9. Mass media as means of communication make ideas clear to children and help them to acquire correct knowledge. They help in simplifying and in giving vividness to explanation.

10. Mass Media make the instruction concrete and stimulate interest and excite curiosity in things.

Education today, therefore, has a far greater responsibility than it had ever before. It has to meet the demands of a dynamic world which change its character every day. Contemporary education has to be more comprehensive and complete than it was ever before. The role of the various agencies of education like home, society, community etc. has consequently increased, so has the role of the mass media like television, radio, cinema, newspaper increased. So now-a-day, press, radio, cinema, television, etc. are becoming more and more important in an individual's life.

Mass Media in Education: Mass media such as press, radio, and television are crucial in education, serving as passive agencies that indirectly shape attitudes and behaviors. They encompass entertainment, informational content, historical records, and educational programming, contributing to moral judgment and public opinion.

(a) **Radio:** Radio serves as a key medium of mass communication, broadcasting events globally and providing valuable entertainment. It plays a crucial role in education by offering a range of programs that include scientific, cultural, and current affairs content. These broadcasts enrich classroom learning, stimulate curiosity, and shape public opinion. Educational radio has become an important supplement to traditional teaching. School broadcasts feature expert teaching on subjects like science, social studies, art, and languages, providing both students and teachers with new insights and approaches. Designed in collaboration with specialists, these programs cater to different age groups and enhance the educational experience.

- **The Role of Radio in Education:**

Broadcasting Information and Events: Radio serves as a mass communication medium that broadcasts events and provides entertainment. It offers educational programs that include scientific, cultural, and current information, enriching classroom teaching by supplementing traditional instruction.

Educational Benefits: Radio facilitates "listening participation," allowing real-time events to be incorporated into classroom discussions. Educational broadcasts can include talks, discussions, and current affairs, enhancing the learning experience and providing fresh perspectives.

Music, Drama, and Creativity: Radio presents a variety of creative content, such as music, drama, and dramatized programs. These broadcasts can enhance the classroom experience by introducing elements of drama and music that are often difficult to achieve in a traditional classroom setting.

Team Teaching and Student Involvement: Radio supports team teaching by organizing programs like quizzes, plays, and interactive sessions. These activities often involve students and local teachers, promoting active participation and collaborative learning.

Promoting Open Learning: Radio contributes to an open learning system by offering educational content that can be accessed outside the traditional classroom setting. It reaches remote areas,

supports self-learning, and integrates into informal and non-formal education, helping to break down the barriers of formal education.

Supporting Teacher Training: Educational radio programs are valuable for teacher training, providing up-to-date content and new teaching methodologies. They assist in curriculum updates and professional development, particularly in subjects like science, mathematics, and social studies.

(b) Television: Today, television has become an extremely popular source of entertainment among youngsters. We listen and see the instruction of the speaker from the television. So the whole personality of the child is engaged in the task. Hence, it has become the most important and powerful agency of mass communication. In television, news items are not only read out but the events are shown. As a result of which not only problems are discussed but practical remedies and solutions are also suggested.

So, educational television is the most recent audio-visual media for class instruction. There are programme on the television especially for the school children. These programme are aimed at educating the school children and they instill good moral values. Television can give a very good idea of the history of the country through dances, short-films on historical places, museums etc. Thus television plays a vital role as a means of mass media in educating the masses.

Advantages of Educational Television:

The advantages of educational television are many. The young people watching the television can get a very good idea of how it really happened. For example the nuclear explosions of the launching of rockets are programme of extreme educational value.

The students can see for themselves how science has advanced:

(1) Educational television is capable of making available many needed and so far inaccessible learning experiences.

(2) Educational television brings about continuing co-operative planning by teachers, supervisors, learning materials exports and skillful production teams.

(3) Good and effective educational television broadcasts result from the outgrowth of curriculum planning, of content analysis and of the selection of this most appropriate instructional media

(4) It can use a variety of audio-visual aids, motion pictures, film-strips, slides, recordings, drawings, maps and other projected and non-projected aids can be demonstrated through Television. Video-tapes and recordings on television bring us the launching of space rockets, of political and social events.

(5) Educational television brings us a new kind of teaching team into existence.

(6) It can acquaint the children with past culture, history and social life.

(7) It can motivate both children and adults, because not only it is educative but also entertaining.

(8) The televised-lectures are more thrilling as they bring to the listeners not only verbal information and the instruction of the speaker but also the whole of his personality engaged in the task.

(9) National problems like those of population and poverty and illiteracy are often highlighted and discussed over the television.

(10) It plays an important role to play in educating the children on the history and culture of our country. It gives a very good idea of the history of the country by telecasting various programmes through dances, short films on historical places, museums etc.

Thus television plays a very vital part, as a means of mass media in educating the masses. It is a dynamic and powerful medium which influence education. Its effective use is based upon the fundamental psychological principles of learning which apply to all successful processes of learning.

Development of Educational Television Experiment in India:

The development of educational television in India can be traced back to the General Conference of UNESCO held in New-Delhi in 1956. Thus the experimental television service was started with the objectives of ―experimentation, training and evaluation‖ as a part of the UNESCO Project. During 1960-61 a series of social education programs were telecast in collaboration with UNESCO.

The nature as well as impact of these programs was evaluated by the National Fundamental Education Centre and Indian Adult Education Association, New-Delhi. Regular TV. Service was inaugurated in Delhi on the 15th August, 1965. It was a landmark in the history of television with launching of the ―Krishi Darshan‖ programme for farmers.

One grand project on television was undertaken and accordingly some T.V Sets were installed in secondary schools by 1985. After execution of this project, this was also evaluated. The experiments of all these projects were significantly beneficial, enlightening and interesting.

Day-by-day the use of educational television increased at a rapid rate and tremendous progress has been made in use of educational television in India after 1982. As the number of schools equipped with T.V. sets increase, benefit of E.T.V. programme were extended to number of students in different subjects like Physics, Chemistry, Hindi, English, Geography and current affairs.

The famous Satellite Instructional Television Experiment (SITE) was implemented during 1975-76. This was inaugurated by Smt. Indira Gandhi, the then Prime Minister of India at Ahmedabad on the 1st August, 1975. The T.V. Programme could be telecast with the help of a satellite called ATS-F loaned by the National Aeronautics and Space Administration, USA.

The T.V. programme were related to Education, Agriculture, Health, Family Planning, National Integration and so on. Rural population was selected as the target audience for this project. In Orissa the scheme was implemented in three districts- Dhenkanal, Sambalpur and Phulbani.

Besides Orissa, the project was undertaken in Andhra Pradesh, Bihar, Karnataka, Madhya Pradesh and Rajasthan. The scheme was effective in educating the rural people.

INSAT Projects:

After successful implementation of SITE in 1975-76 in India by NASA, USA; India decided to have a Satellite of her own. With a view to utilizing the INSAT capability for educational development, the Ministry of Education initiated action for preparing plans of operation as early as in July 1979. So a meeting was convened by the Ministry of Education on the 30th January, 1980 to discuss the background paper and all connected issues involved in the satellite utilisation for radio and television programme.

The Ministry of Education, Government of India, in collaboration with UNESCO, convened National Workshop on Educational Broadcasting from December 1 to 6, 1980 at New Delhi. The workshop assumed special significance on account of the Nation‘s renewed emphasis on Educational Broadcasting on the even of putting INSAT in the orbit. So the first Indian Satellite, INSAT-IA was launched on 10 April, 1982. The second satellite INSAT-IB was launched on 30 August 1983 with modified advanced technical equipment‘s for the use of educational broadcasts through television.

The Central Institute of Educational Technology under the NCERT at New Delhi, is mainly concerned with the development of innovations and with using various media in school education. It is engaged in the development of an attractive system of education using television through INSAT to reach in and out of school children and teachers in rural areas. It produces E.T.V. programme and these programme are being telecast via INSAT. State Institute of Educational Technology (SBET) has been set up in six states such as Andhra Pradesh, Bihar, Gujarat, Maharashtra, Orissa and Uttar Pradesh in order to implement the INSAT for education project effectively.

Orissa is one of the six states to avail itself the T.V. Services through INSAT. Now-a-days, more emphasis is given to the production of ETV programme for the children in the age group 5-8 and 9-11 years and teachers of primary schools. The ETV programme of Orissa are being telecast for 45 minutes starting from 10.30 a.m. to 11.15a.m. with 5 minutes for change over.

There are Advisory Committees, one at the state level for the entire INSAT project and another for ETV programme through the INSAT. At present more districts like Cuttack, Puri and Balsasore are being included in the scheme. In the INSAT states (Andhra Pradesh, Bihar, U.P, Gujarat, Maharashtra and Orissa), Education T.V. Programme are telecast for five day in a week for 45 minutes per day. This is done with the school hours. A recent study carried out in Orissa by the CIET has brought out that only in 15% of the cases, there has been successful utilisation of the equipment.

The six INS AT states were expected to create State Institutes of Educational Technology (SET) to function autonomously. So far, only Orissa has taken a decision on the creation of this Institute. As a result, a building for SIET has been constructed at Bhubaneswar.

118 posts for Academic & Production, Engineering and Administration have been released by the Government of India In the existing institution, technical and professional posts have remained unfilled.

At present ETV programme are being telecast via INSAT-ID since 1990 after the expiry of INSAT -IB and the failure of INS AT-IC. The INSAT is a challenging National project and its experiments inter alia, will provide new light and insight into the viewing problems and conditions of the rural audience deprived of modem sophisticated media.

(c) The Press:

The Press covers the entire printed matter. These printed matters are books, magazines, journals or newspapers. Reading matter has vast potentialities. It exerts good influence on the individuals. It acts on the intelligence and emotions of the individuals in shaping out attitudes and philosophies of life.

An educated individual one who has an open mind, a general awareness and knowledge of the world around him. His field of knowledge is vast and varied. Newspapers contribute very largely in education for the above end. Press not only gathers events, they also present their own views on issues. So the reader gets an opportunity to consider an issue from many angles. Press also contributes to the study of History, Geography, Science, Literature etc. The knowledge is supplemented to these subjects by the newspapers. It is possible to link certain topics with everyday life by means of the press through newspapers and other journals. The child must be aware of what is happening in the world around him. So the press is an important service that can render to education by imparting knowledge of current affairs to children. News regarding earthquakes, cyclones, new planets and political changes may be brought to the notice of the pupils by the press. It also gives a great deal of historical information. The pupil‘s limited knowledge of history may be elaborated and enhanced by this press. So the press is to serve as one of the important medium of education and instruction.

(d) The motion Pictures:

The motion pictures exercise a great influence on human mind very skillfully. They help to create lasting values in the pupils. There is also wider use of films in education. Educational films are coming into the field to meet the challenge of commercial pictures, to supplement them and to explore new avenues of educating children and adults. These films can give more reality, influence attitudes, show cause and effect relation and motivate the students., Thus these motion pictures have great instructional force which can be used intelligently in the classroom. There are many areas of learning which can be properly dealt with the help of films. For example, in teaching of

geography or science, we can use these motion-pictures. Rivers of India, climate of India etc. can also be taught effectively with the help of the motion pictures.

Advantages of Motion Pictures:

1. The educational films make the concept more clear, durable and realistic.

2. Motion pictures arouse interest in children and satisfy their emotions.

3. They can present abstract and abstruse problems of life and nature in concrete reality, illuminate the hidden meanings of events and mysteries of nature, reconstruct history in a short mirror of life.

4. Motion pictures bring the past, the distant to the class room. It can bring the whole world to the classroom.

5. Events which occur over-days can be made to appear in seconds. So Motion pictures can also be replayed many number of times when and where required.

6. Motion pictures can best be used for demonstration of skills and experiments.

7. Motion pictures can serve the purpose better, if they are made for specific age and ability groups, if they can be fitted into the school syllabus, if the commentary is simple and straight forward.

8. Motion pictures can be of great service in teaching the backward children, because they do act on the imagination of children.

Today, education plays a vital role. It has to meet the demands of a dynamic world. The role of the various agencies of education has consequently increased. Thus the role of mass media as passive agencies of education cannot be under-estimated. Because it has tremendous influence on the attitude and behaviour of the people.

- **Check your progress**

13. Which mass media tool provides visual and auditory learning experiences?
14. What is the full form of SITE and INSAT?
15. What was the primary focus of the SITE project in India?
16. What type of media brings the past and distant events to the classroom?
17. Which technology supports educational content via satellite in India?

Principles of using Mass Media:

The teacher should make all necessary arrangements for using the mass media very effectively. He should select the mass media according to the age level of the students. He must know some general principles of using the mass media.

1. Organisation: Mass media should be organized as integral part of the educational programme. They should not be separated from other curricular activities.

2. **Selection:** Mass media should be properly selected and coordinated by the teacher. An experienced and trained teacher can select the mass media according to the needs of the students.

3. **Planning:** Mass media should be available according to the need of the instructional programme. The teachers should possess skill in the use of mass media. They should have special training in their preparation. So they should be properly planned.

4. **Experience:** Mass media should be related to pupil‘s experience.

5. **Preparation:** There should be adequate preparation on the part of pupils. The teacher should prepare himself before using it. He should know what the mass media teach and where they fit into his plan of teaching. Adequate preparation should be followed by proper presentation and an adequate follow-up.

6. **Evaluation:** Mass media should be evaluated at regular intervals in regards to their use, effect on learning and their functions.

2.9 Designing Instructional system

Instructional Design (also called Instructional Systems Design (ISD)) is the practice of creating "instructional experiences which make the acquisition of knowledge and skill more efficient, effective, and appealing." The process consists broadly of determining the current state and needs of the learner, defining the end goal of instruction, and creating some "intervention" to assist in the transition. Ideally the process is informed by pedagogically (process of teaching) and andragogically (adult learning) tested theories of learning and may take place in student-only, teacher-led or community-based settings. The outcome of this instruction may be directly observable and scientifically measured or completely hidden and assumed. There are many instructional design models but many are based on the ADDIE model with the five phases: analysis, design, development, implementation, and evaluation. As a field, instructional design is historically and traditionally rooted in cognitive and behavioral psychology, though recently Constructivism (learning theory) has influenced thinking in the field.

Instructional design models

ADDIE process

Perhaps the most common model used for creating instructional materials is the ADDIE Model. This acronym stands for the 5 phases contained in the model (Analyze, Design, Develop, Implement, and Evaluate).

Brief History of ADDIE’s Development – The ADDIE model was initially developed by Florida State University to explain ―the processes involved in the formulation of an instructional systems development (ISD) program for military inter service training that will adequately train individuals

to do a particular job and which can also be applied to any inter service curriculum development activity.‖[50] The model originally contained several steps under its five original phases (Analyze, Design, Develop, Implement, and [Evaluation and] Control), whose completion was expected before movement to the next phase could occur. Over the years, the steps were revised and eventually the model itself became more dynamic and interactive than its original hierarchical rendition, until its most popular version appeared in the mid-80s, as we understand it today.

The five phases are listed and explained below:

ADDIE Model

Analyze – The first phase of content development is Analysis. Analysis refers to the gathering of information about one‘s audience, the tasks to be completed, how the learners will view the content, and the project‘s overall goals. The instructional designer then classifies the information to make the content more applicable and successful.

Design – The second phase is the Design phase. In this phase, instructional designers begin to create their project. Information gathered from the analysis phase, in conjunction with the theories and models of instructional design, is meant to explain how the learning will be acquired. For example, the design phase begins with writing a learning objective. Tasks are then identified and broken down to be more manageable for the designer. The final step determines the kind of activities required for the audience in order to meet the goals identified in the Analyze phase.

Develop – The third phase, Development, involves the creation of the activities that will be implemented. It is in this stage that the blueprints of the design phase are assembled.

Implement – After the content is developed, it is then Implemented. This stage allows the instructional designer to test all materials to determine if they are functional and appropriate for the intended audience.

Evaluate – The final phase, Evaluate, ensures the materials achieved the desired goals. The evaluation phase consists of two parts: formative and summative assessment. The ADDIE model is an iterative process of instructional design, which means that at each stage the designer can assess the project's elements and revise them if necessary. This process incorporates formative assessment, while the summative assessments contain tests or evaluations created for the content being implemented. This final phase is vital for the instructional design team because it provides data used to alter and enhance the design.

Connecting all phases of the model are external and reciprocal revision opportunities. As in the internal Evaluation phase, revisions should and can be made throughout the entire process. Most of the current instructional design models are variations of the ADDIE process‘

Another well-known instructional design model is The Dick and Carey Systems Approach Model. The model was originally published in 1978 by **Walter Dick and Lou Carey in their book entitled The Systematic Design of Instruction**

Dick and Carey made a significant contribution to the instructional design field by championing a systems view of instruction, in contrast to defining instruction as the sum of isolated parts. The model addresses instruction as an entire system, focusing on the interrelationship between context, content, learning and instruction. According to Dick and Carey, "Components such as the instructor, learners, materials, instructional activities, delivery system, and learning and performance environments interact with each other and work together to bring about the desired student learning outcomes".[56] The components of the Systems Approach Model, also known as the Dick and Carey Model, are as follows:

- Identify Instructional Goal(s): A goal statement describes a skill, knowledge or attitude (SKA) that a learner will be expected to acquire
- Conduct Instructional Analysis: Identify what a learner must recall and identify what learner must be able to do to perform particular task
- Analyze Learners and Contexts: Identify general characteristics of the target audience, including prior skills, prior experience, and basic demographics; identify characteristics directly related to the skill to be taught; and perform analysis of the performance and learning settings.
- Write Performance Objectives: Objectives consists of a description of the behavior, the condition and criteria. The component of an objective that describes the criteria will be used to judge the learner's performance.
- Develop Assessment Instruments: Purpose of entry behavior testing, purpose of pretesting, purpose of post-testing, purpose of practive items/practive problems
- Develop Instructional Strategy: Pre-instructional activities, content presentation, Learner participation, assessment
- Develop and Select Instructional Materials
- Design and Conduct Formative Evaluation of Instruction: Designers try to identify areas of the instructional materials that need improvement.
- Revise Instruction: To identify poor test items and to identify poor instruction
- Design and Conduct Summative Evaluation

With this model, components are executed iteratively and in parallel, rather than linearly. Another instructional design model is the Guaranteed Learning model formerly known as the **Instructional Development Learning System (IDLS).** The model was originally published in 1970 by Peter J. Esseff, PhD and Mary Sullivan Esseff, PhD in their book entitled *IDLS—Pro Trainer 1: How to Design, Develop, and Validate Instructional Materials.*

Peter (1968) & Mary (1972) Esseff both received their doctorates in Educational Technology from the Catholic University of America under the mentorship of Dr. Gabriel Ofiesh, a founding father of the Military Model mentioned above. Esseff and Esseff synthesized existing theories to develop

their approach to systematic design, "Guaranteed Learning" aka "Instructional Development Learning System" (IDLS). In 2015, the Drs. Esseffs created an eLearning course to enable participants to take the GL course online under the direction of Dr. Esseff. See GuaranteedLearning.co for further information (2015-3-13).

The components of the Guaranteed Learning Model are the following:

- Design a task analysis
- Develop criterion tests and performance measures
- Develop interactive instructional materials
- Validate the interactive instructional materials
- Create simulations or performance activities (Case Studies, Role Plays, and Demonstrations)

Check your progress

18. What does ISD stand for?
19. What are the five phases of the ADDIE model?
20. Who initially developed the ADDIE model?
21. Which model was formerly known as IDLS?
22. What are the two parts of the Evaluation phase in ADDIE?

2.10 Formulation of Instructional Objectives

An instructional objective is a description of the result expected from a learning experience. It describes the performance or the behavior expected of the leaner at the end of the learning activity. The term instructional objective is used interchangeably with performance, behavioral or learning objective. Objectives are essential in all phases of instructions. Instructional objectives give the following advantages:

- They provide a guide in selecting the materials to use and the methods to employ in teaching.
- They provide standards for measuring acceptable student behavior.
- They serve as criteria for evaluating the quality and efficiency of instruction.
- They serve as a contract between the learner and the instructor.
- They allow self-evaluation on the part of the learner.

Classification of Educational Objectives

Objectives may fall in any of the three domains. Years ago, Bloom and other educational psychologists came up with three classification of objectives to assist in developing assessment instruments. These learning domains are cognitive, affective, and psychomotor.

Cognitive objectives deal with knowledge and the five intellectual abilities related to processing of knowledge. Objectives in the cognitive domain range from the simplest to the most complex. They are comprehension, application, analysis, synthesis, and evaluation. The learners must first possess the basic knowledge before they can engage in higher level of cognitive performance.

In Bloom's taxonomy of cognitive domain, objectives are arranged in a hierarchy. The lowest level is knowledge, which involves recalling or recognizing an idea or concept.

Comprehension is the second level. It is the ability to translate an idea or concept from one form to another.

Application, on the other hand, is the use of an idea or information in a new situation. For instance, what you learn in the lecture, can you apply it in the field.

The fourth level is analysis; to examine or break down a complex concept into parts or elements.

Synthesis, which means putting together information in a new or unique way is the fourth level.

The highest level in the hierarchy is evaluation. It is the process of making judgment about something using external criteria. Judging the internal coherence of a piece of communication such as a proposal or a plan is an example of evaluation.

Affective objectives: When the expected performance deals with actions associated with feelings and emotions, they belong to the affective or attitude domain. Affective outcomes are more difficult to assess since feelings are highly subjective and internal Skills in the affective domain describe the way people react emotionally and their ability to feel other living things' pain or joy. Affective objectives typically target the awareness and growth in attitudes, emotion, and feelings. There are five levels in the affective domain moving through the lowest order processes to the highest:

Receiving: The lowest level; the student passively pays attention. Without this level no learning can occur. Receiving is about the student's memory and recognition as well.

Responding: The student actively participates in the learning process, not only attends to a stimulus; the student also reacts in some way.

Valuing: The student attaches a value to an object, phenomenon, or piece of information. The student associates a value or some values to the knowledge they acquired.

Organizing: The student can put together different values, information, and ideas and accommodate them within his/her own schema; comparing, relating and elaborating on what has been learned.

Characterizing: The student holds a particular value or belief that now exerts influence on his/her behavior so that it becomes a characteristic.

Psychomotor: Psychomotor objectives are those having to do with manual and motor skills. Physical activities and other skills that require body coordination belong to this domain.

Skills in the psychomotor domain describe the ability to physically manipulate a tool or instrument like a hand or a hammer. Psychomotor objectives usually focus on change and/or development in behavior and/or skills.

Bloom and his colleagues never created subcategories for skills in the psychomotor domain, but since then other educators have created their own psychomotor taxonomies.[6] Simpson (1972) proposed the following levels:

Perception: The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation. Examples: Detects non-verbal communication cues. Estimate where a ball will land after it is thrown and then moving to the correct location to catch the ball. Adjusts heat of stove to correct temperature by smell and taste of food. Adjusts the height of the forks on a forklift by comparing where the forks are in relation to the pallet. Key Words: **chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects.**

Set: Readiness to act, it includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a person's response to different situations (sometimes called mindsets). Examples: Knows and acts upon a sequence of steps in a manufacturing process. Recognize one's abilities and limitations. Shows desire to learn a new process (motivation). NOTE: This subdivision of Psychomotor is closely related with the ―Responding to phenomena‖ subdivision of the Affective domain. Key Words: begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers.

Guided response: The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing. Examples: Performs a mathematical equation as demonstrated. Follows instructions to build a model. Responds to hand-signals of instructor while learning to operate a forklift. Key Words: copies, traces, follows, react, reproduce, responds.

Mechanism: This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency. Examples: Use a personal computer. Repair a leaking tap. Drive a car. Key Words: assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.

Complex overt response: The skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy. This category includes performing without hesitation, and automatic performance. For example, players will often utter sounds of satisfaction or expletives as soon as they hit a tennis ball or throw a football, because they can tell by the feel of the act what the result will produce.

Adaptation: Skills are well developed and the individual can modify movement patterns to fit special requirements. Examples: Responds effectively to unexpected experiences. Modifies instruction to meet the need of the learners. Perform a task with a machine that it was not originally intended to do (machine is not damaged and there is no danger in performing the new task). Key Words: adapts, alters, changes, rearranges, reorganizes, revises, varies.

Origination: Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills. Examples: Constructs a new theory. Develops a new and comprehensive training programming. Creates a new gymnastic routine. Key Words: arranges, builds, combines, composes, constructs, creates, designs, initiate, makes, originates.

The major criterion in determining the domain to which an instructional objective belongs to is the primary performance called for. For instance, when the objective has something to do with knowledge or mental ability, it belongs to the cognitive domain. When the expected performance deals with attitude, it belongs to the affective domain. When it relates with skills or physical activity, then it can be classified as psychomotor or skills domain.

Writing Instructional Objectives

Different authors discuss parts of an instructional objective differently, however there common parts. Minnick (1989) for example gave 4 parts on instructional objective, namely, preamble, verb, object, and chunk. Other authors give 3 parts only, verb, the conditions/restrictions under which the behavior is to be demonstrated, and the criterion for acceptable performance.

Preamble, The first part or the beginning of the objective that set the stage to follow is the preamble. Examples of preambles are as follows:

1. After reading the module
2. At the end of this presentation
3. This lecture will enable

Verb, The second part of the objective is the verb. The emphasis here is on the action or behavior the learner is to perform. When we state our objectives, we should use verbs that are specific, measurable, and observable. Look at the following lists of words and see the difference between them.

A	B
Identify	Understand
Describe	Know
Compare	Appreciate

Construct Learn

Words in list A are specific whereas words in list B are vague and could be open to many interpretation. Minnick (1989) calls specific verbs closed and the verbs that are vague as open verbs. They convey various meanings to different people. Use closed or specific verbs when writing your objectives. See Table 1 for a list of verbs that could be used for stating objectives in the cognitive domain.

Object, The third part of an objective is the object of the verb. While the verb tells what you want the learner to do, the object tells him or her, what to do on what.

Look at the following examples of objectives that contain the 3 parts mentioned:

1. After reading the lesson, you will be able to define communication.
2. After this presentation, you should be able you to write instructional objectives.
3. At the end of the lesson, the trainees should be able to use television as teaching aids.

❖ Check your progress

23. What are the three domains of educational objectives according to Bloom?
24. What is the lowest level in the affective domain?
25. Which domain involves manual and motor skills?
26. What are the three common parts of an instructional objective?

2.11 Let us sum up

In this chapter, we delved into how communication shapes and enhances education. We started by unpacking what communication is and how it works, looking at its core components and different types. We then focused on how communication plays out in classrooms and the role of mass media in educational technology. We also explored the design of instructional systems and how to set clear, effective learning goals. Overall, this chapter highlights the vital role of communication in making teaching and learning more effective, engaging, and impactful.

2.12 Further Reading

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2.13 Answer to check your progress

1. Communication is the field of study concerned with the transmission of information by various means, such as print or broadcasting. It is considered as the act of transfer.

2. The basic characteristic is the interchange of information, which is a two-way process between two or more persons.

3. The primary purpose of communication is to motivate a response or influence human behavior.

4. The two types of communication channels are formal and informal.

5. Sender, Receiver, Channel

6. Transmits the message

7. Relationship, message gravity, number of receivers, costs, and amount of information

8. Communication that flows both up and down an organization.

9. Traffic signals

10. Verbal and Non-Verbal

11. Avoid talking for more than 8-15 minutes at a stretch.

12. Repetitively check their comprehension before moving on.

13. Television

14. SIET - Satellite Instructional Television Experiment and INSAT - Indian National Satellite System.

15. Rural education

16. Motion pictures

17. INSAT

18. Instructional Systems Design

19. Analyze, Design, Develop, Implement, Evaluate

20. Florida State University

21. Guaranteed Learning model

22. Formative and summative assessment
23. Cognitive, affective, psychomotor
24. Receiving
25. Psychomotor
26. Verb, object, conditions (or preamble and criteria)

2.14 Model Questions

1. Explain the concept of communication, including its definitions and key characteristics. How do these characteristics affect teaching and learning?
2. Analyze the nature of communication, focusing on its continuous and dynamic aspects. How do these features influence interpersonal interactions and professional settings?
3. Describe the different forms of communication (verbal, non-verbal, formal, informal). How do these types contribute to effective communication in educational environments?
4. What are the seven major elements in the communication process? Describe the role of each element and explain how they contribute to effective communication.
5. What are the key components of the communication process? Discuss the roles of context, sender/encoder, message, medium, recipient/decoder, and feedback, and provide examples of their impact.
6. Compare the different types of communication: oral, written, vertical, horizontal, grapevine, object, intra-personal, inter-personal, group, and mass communication. Highlight their main characteristics, advantages, and limitations.
7. Differentiate between verbal and non-verbal communication. Explain the subtypes of each and discuss how they affect message transmission and reception.
8. Explain the importance of effective classroom communication and the role it plays in the teaching-learning process.
9. What strategies can a teacher use to maintain students' attention during a lecture?
10. Discuss the benefits and uses of mass media in education. How do different types of mass media support learning?
11. Describe the role and advantages of educational television in the classroom. How does it enhance the learning experience?
12. What are the principles for effectively using mass media in education? How should a teacher select and integrate mass media into their teaching?
13. Explain the process of Instructional Systems Design (ISD) and its significance in creating effective learning experiences. Outline the key phases and their roles.
14. Compare the ADDIE Model and the Dick and Carey Systems Approach Model in instructional design. What are their main differences and strengths?
15. What are instructional objectives and why are they important? Discuss their advantages in guiding instruction and evaluating effectiveness.

16. Compare the cognitive, affective, and psychomotor domains of educational objectives. How do these domains affect instructional development and assessment?
17. How do you write effective instructional objectives? Describe the components like preamble, verb, and object, and explain how specific verbs improve clarity.

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UNIT-III
Teaching Levels, Strategies and Models

Unit Structure

3.0 Learning objectives

- ✓ To understand the various teaching levels and their implications for instructional design.
- ✓ To identify and describe different teaching strategies and their applications in diverse educational settings.
- ✓ To analyze various teaching models and evaluate their effectiveness in facilitating student learning.
- ✓ To apply knowledge of teaching levels, strategies, and models to develop effective lesson plans.
- ✓ To evaluate the impact of behavior modification techniques on student engagement and learning outcomes.

3.1 Introduction

Effective teaching requires a deep understanding of various pedagogical components that influence student learning. This chapter explores teaching levels, strategies, and models, focusing on how these elements shape instructional practices. Teaching levels address the stages of cognitive development, teaching strategies cover the methods used to facilitate learning, and teaching models provide structured frameworks for delivering instruction. Additionally, the chapter will examine behavior modification techniques to enhance student engagement and outcomes. Together, these components offer a comprehensive approach to designing effective and responsive teaching practices.

3.2 Teaching Levels

Teaching is a purposeful process closely related to learning, with modern perspectives often merging the two into a single concept. The nature of content influences various learning levels and objectives, with teachers capable of presenting material across three distinct

levels: Memory, Understanding, and Reflective. The effectiveness of teaching at these levels depends significantly on the teacher's competency and experience. Typically, conventional teaching aligns with the memory level, while skilled educators strive to elevate their practice to the reflective level.

3.2.1 Memory Level

Memory is a fundamental mental process essential to learning and involves the retention and recall of experiences and information. When a person encounters an object, place, or event, a mental image is formed, which is stored and recalled as needed. Key definitions of memory include:

Woodworth: "Memory is the direct use of what is learned."
J.S. Ross: "Memory is a new experience determined by dispositions laid down by a previous experience, with a clear apprehension of their relationship."
McDougall: "Memory involves imagining events as experienced in the past and recognizing them in relation to one's own past experiences."
Stout: "Memory is the ideal revival of past experiences, reinstating them in the order and manner of the original occurrence."

Phases of Memory:

Learning: This phase involves acquiring new knowledge, which is processed by the conscious mind and stored as mental impressions. Repetition and meaningful engagement with the material enhance memorization.

Retention: Retention is the ability to keep learned information over time. Variations in retention power arise from individual differences in brain structure, health, interest, and cognitive processes. Retention typically peaks around age 25 and declines thereafter.

Recall: Recall involves retrieving learned material from memory. Effective recall depends on the ability to bring information to consciousness when needed. Factors influencing recall include the laws of contiguity, similarity, contrast, continuity of interest, primacy, recency, frequency, and vividness.

Recognition: Recognition is the process of identifying previously encountered objects or individuals. It relies on strong associations between memories. Difficulties in recall often occur when associations are weak, while strong associations facilitate quick recognition.

Characteristics of Good Memory

- Rapidity in Learning: The ability to learn quickly is a hallmark of good memory.
- Stability of Retention: Good memory retains information for a prolonged period.
- Rapidity in Recall: Effective memory allows for quick retrieval of information.

- Serviceableness: A good memory recalls relevant material when needed, avoiding irrelevant or extraneous information.
- Forgetting Irrelevant Things: A strong memory efficiently filters out non-essential information.

Types of Memory:

Immediate Memory: Immediate memory is the type of memory that enables individuals to recall information shortly after learning it. It is typically short-lived, retaining information for only a few seconds to a minute. As people age and their cognitive abilities improve, the capacity for immediate memory develops. Examples include remembering a phone number long enough to dial it or recalling a name shortly after being introduced.

Personal Memory: Personal memory refers to the recall of specific experiences from one's own life. This type of memory is deeply individualized and often shaped by personal significance and emotional impact, contributing to one's sense of identity and understanding of past events. For instance, recalling a childhood birthday party or a memorable vacation involves personal memory.

Permanent Memory: Permanent memory involves retaining information over the long term, especially when there are strong associations or meaningful connections. This type of memory is characterized by its durability and involves deeper processing of information. Strong associations, repetition, and meaningful engagement help to preserve this type of memory. Examples include knowledge of one's native language, mathematical principles, or long-term facts learned in school.

Logical Memory: Logical memory relies on reasoning and intellect to understand and recall information. It is based on the ability to make connections between concepts through logic and analytical thinking. This type of memory is often utilized in problem-solving and understanding complex theories. For example, solving a mathematical problem using known formulas or understanding theories through logical deduction involves logical memory.

Rote Memory: Rote memory involves memorizing information through repetition without necessarily understanding its meaning. It is commonly used in early childhood and involves repetitive practice to commit information to memory. Examples of rote memory include memorizing multiplication tables or historical dates through repeated recitation.

Mechanical Memory: Mechanical memory, also known as physical memory, involves performing tasks that become automatic through repeated practice. This type of memory allows individuals to execute tasks without conscious effort, as they have become habitual. Examples include typing on a keyboard, driving a car, or playing a musical instrument skillfully without active thought.

Active Memory: Active memory requires conscious effort to recall information, often involving deliberate retrieval strategies. This type of memory is used when actively trying to remember specific information, such as during exams or problem-solving activities. Examples include recalling facts for a test or remembering details for a presentation.

Passive Memory: Passive memory involves the effortless recall of information, often occurring without active effort or conscious retrieval. This type of memory allows for spontaneous recall of well-learned or frequently encountered information. For example, recognizing a familiar face in a crowd or recalling a well-known song lyric involves passive memory.

Impressional Memory: Impressional memory refers to recalling information learned from external sources, without personal experience. This type of memory relies on the ability to remember material encountered through reading, listening, or observation. Examples include remembering facts from a lecture or details from a book.

Model of Memory-Level Teaching:

Focus: Herbart's model of memory-level teaching emphasizes the systematic repetition and memorization of facts to enhance mental capacities related to knowledge retention and recall. This approach focuses on cramming facts and building a solid foundation of knowledge that can be readily recalled. For example, using drills and practice sessions helps ensure that students remember key historical dates or mathematical formulas.

Syntax: Preparation involves assessing students' prior knowledge to spark curiosity and readiness for new learning. Effective preparation engages students' existing knowledge and sets the stage for new information. This might include asking questions related to the upcoming lesson to activate prior knowledge and stimulate interest.

Statement of Aim: Clearly defining the lesson's objectives helps students understand what they are expected to learn. Providing a clear focus and purpose for the lesson guides the learning process. This can be achieved by writing the lesson objectives on the board and discussing them with students to ensure they grasp the goals of the lesson.

Presentation: Developing the lesson with active student involvement facilitates understanding and retention. Engaging students in the lesson through interactive methods such as group discussions or hands-on activities enhances their learning experience and helps solidify their grasp of the material.

Comparison and Association: Relating new knowledge to existing information through comparisons and associations aids in understanding and retention. By making connections between new and prior knowledge, students integrate and remember the material more

effectively. This might involve comparing new concepts to previously learned topics or using analogies to clarify new information.

Generalization: Formulating principles and general laws based on the lesson's content helps in applying knowledge to various situations. Generalization requires abstract thinking and the ability to apply learned principles to different contexts. For instance, deriving general rules from specific examples or applying concepts to new scenarios helps reinforce understanding.

Application: Testing whether new knowledge can be applied in different contexts ensures its practical use and permanence. Application involves using learned material in real-life or hypothetical situations to reinforce understanding. This could include providing problems or case studies where students apply newly learned concepts.

Social System: In memory-level teaching, the teacher plays a dominant role while students passively receive information. The teacher directs the learning process, with students acting as recipients of the structured content. This approach often involves lecturing and providing clear, organized material for memorization.

Support System: Evaluation at this level involves assessing students' ability to recall and apply memorized information through oral and written exams. Assessments focus on rote memorization and factual recall, using both objective and essay questions. Quizzes and tests that emphasize the memorization of facts and details are common methods of evaluation.

Guidelines for Effective Memory-Level Teaching:

Achieve Cognitive Objectives: Effective teaching should align with cognitive goals by focusing on specific knowledge and skills. Lessons must have clear objectives to aid understanding and retention. Setting specific learning goals and designing targeted activities help students achieve these cognitive outcomes.

Purposeful Content: Presenting content that is relevant and meaningful enhances memory-level teaching. Choose topics that resonate with students' lives or future studies to make the learning experience more engaging and relevant.

Holistic Presentation: Teaching should cover all relevant aspects of a topic comprehensively. This involves providing detailed explanations, examples, and practice opportunities to ensure a complete understanding of the material.

Sequential Learning: Organize lessons logically, starting with basic concepts and progressing to more complex ideas. This structured approach helps students build a solid foundation and facilitates a smoother learning experience.

Avoid Teaching When Students Are Tired: Schedule lessons for times when students are most alert and receptive. Teaching during peak times, such as early morning, maximizes engagement and ensures students are at their best for learning.

Use Whole-Method: Employ holistic teaching methods that integrate various learning aspects, including cognitive, emotional, and social dimensions. Combining lectures, discussions, and hands-on activities provides a comprehensive learning experience.

Reinforcement System: Use consistent reinforcement strategies to solidify learning and retention. Techniques like regular feedback, rewards, and additional practice help maintain and strengthen students' grasp of the material.

Practice Recall: Encourage frequent recall practice to strengthen memory. Regular reviews and quizzes help reinforce learning through active retrieval and repetition, improving students' ability to remember information.

Recapitulation: Periodically review and summarize key concepts to enhance retention. Recapitulation reinforces learning and aids in long-term memory by continuously revisiting important information.

Check your progress

1. What is the primary focus of memory-level teaching according to Herbart's model?
2. What phase of memory involves acquiring new knowledge and storing it as mental impressions?
3. Define "Immediate Memory."
4. Name one characteristic of a good memory.
5. What is the difference between "Recognition" and "Recall" in memory processes?

3.2.2 Understanding Level of Teaching

In the understanding level of teaching, the primary focus is on helping students grasp generalizations, principles, and facts. This stage of teaching emphasizes thoughtful instruction aimed at developing the intellectual behaviors necessary for making generalizations, gaining insight, and solving problems. Both teachers and students play active roles in developing the lesson, which fosters a more engaging and interactive learning environment.

Morrison's Teaching Model

Morrison's Teaching Model for understanding-level teaching is structured into several key components:

1. **Focus:**

The goal of the understanding level is for students to achieve mastery of the concept. The teacher emphasizes content mastery to bring about a significant change in students' personalities. This focus aims at ensuring that students internalize the content thoroughly.

2. Syntax:

Morrison divides the syntax of understanding-level teaching into five distinct steps:

Exploration:

During this phase, the teacher assesses prior knowledge through questioning, organizes content elements logically from a psychological perspective, and decides on the presentation sequence of new knowledge.

Presentation:

The teacher is highly active in this stage, presenting content in small, sequential units while maintaining a connection with the students. The teacher also evaluates whether the students have understood the material, making adjustments and recapping as needed until comprehension is achieved.

Assimilation:

Once the content is presented, students are given opportunities to assimilate the new knowledge. This involves allowing students to generalize the content, delve deeper into the material, and engage in individual activities. Assimilation includes working in labs and libraries, completing home assignments, and undergoing supervised study where both students and teachers are actively involved. If mastery is not achieved, additional opportunities for assimilation are provided.

Organization:

In this stage, students undergo a mastery test. Successful completion of this test leads to the organization or recitation phase, where students re-present the content in their own words. This step helps the teacher assess whether students can independently articulate the content.

Recitation:

The final step involves students presenting the content orally to the teacher and peers, demonstrating their understanding and mastery.

3. Social System:

The social system in understanding-level teaching evolves throughout the process. During presentation, the teacher controls the students' behavior, similar to memory-level teaching, while providing necessary motivation. In the assimilation phase, both students and the teacher are active, with the teacher offering guidance as students engage in independent work.

4. Support System:

The support system in understanding-level teaching is dynamic, involving various forms of evaluation. Students must pass presentation tests to move on to assimilation, and similarly, they must complete assimilation successfully to proceed to organization and recitation. Both oral and written tests (including essay and objective types) are used to assess students' progress.

Features:

The understanding-level model has certain limitations and characteristics:

- The emphasis on content mastery may overlook the psychological aspects of human behavior.
- The teacher's involvement in the content is seen as a motivational factor, but psychological motivation could be more effective.
- The model focuses primarily on cognitive development, potentially neglecting affective and psychomotor aspects.
- Despite its limitations, Morrison's model is effective in facilitating deep content study and complete learning.

Guidelines:

To enhance the effectiveness of understanding-level teaching, Morrison suggests:

- Allow students to enter this level only after passing memory-level tests.
- Follow each step of understanding-level teaching in the prescribed sequence.
- Ensure students pass tests at each stage before advancing to the next.
- Provide psychological motivation regularly and raise students' aspiration levels.
- Address any issues related to understanding-level teaching proactively.

Reflective Level of Teaching

Reflective-level teaching is characterized by a problem-centered approach, where the classroom environment is open and encourages students to engage deeply with problems. The teacher presents a problem that generates significant mental tension, prompting students to develop and test their hypotheses independently. This teaching level aims to foster creative thinking and problem-solving skills, equipping students to handle real-life challenges effectively.

Hunt's Model of Teaching

Hunt's Model for reflective-level teaching includes the following components:

1. Focus:

Reflective-level teaching aims to develop three key competencies among students:

- Problem-solving skills.
- Critical and constructive thinking.

- Independent and original thinking capabilities.

2. Syntax:
The syntax of reflective-level teaching is outlined in four steps:

Problem Creation:
The teacher initiates a problematic situation that encourages students to think critically and engage in problem-solving.

Hypothesis Formulation:
Students generate multiple hypotheses to address the problem, exploring various potential solutions.

Data Collection:
Students gather data to test their hypotheses, determining the viability of their proposed solutions.

Hypothesis Testing:
Students test their hypotheses and derive results based on their findings, leading to the formation of original ideas.

3. Social System:
In reflective-level teaching, the classroom environment is open and student-centered. The teacher's role is to present problems, facilitate discussions, and raise students' aspirations. The focus is on fostering self-motivation and creating a supportive social environment for problem-solving.

4. Support System:
Objective tests are not suitable for evaluating reflective-level teaching. Instead, evaluation should focus on:

- Attitudes and beliefs of students.
- Their involvement in learning activities.
- Development of critical and creative competencies.

Features:
Reflective-level teaching has specific characteristics and limitations:

- There is no fixed program, unlike memory and understanding levels.
- It is suitable for higher-class students due to its complexity and the developmental maturity required.
- The teaching approach is problem-centered and relies heavily on group discussions.
- Reflective teaching extends beyond the curriculum and textbooks, allowing students to openly critique their teachers.

Guidelines:

To make reflective-level teaching more effective, Hunt recommends:

- Allow students to advance to reflective-level teaching only after mastering memory and understanding levels.
- Adhere to the four steps of reflective-level teaching with appropriate precautions.
- Raise students' aspirations and address any weaknesses through cognitive field psychology.
- Create problem situations that promote original and creative thinking.
- Maintain a free and open classroom environment to encourage active participation and discussion.

Check your progress

6. What is the primary focus of understanding-level teaching?
7. Name the first step in Morrison's syntax for understanding-level teaching.
8. What are the three objectives of reflective-level teaching according to Hunt?
9. What is a key characteristic of the reflective-level teaching environment?

3.3 Teaching Strategies

Teaching strategies encompass a range of methods and techniques applied to achieve specific educational objectives in various contexts. The teacher must carefully choose the appropriate method or combination of methods and techniques to suit the situation at hand. These strategies can be thought of as broad instructional approaches that guide the overall teaching process.

It is important to distinguish between teaching methods and techniques. Teaching methods are directly linked to teaching objectives and determine the direction and pace of instruction. On the other hand, teaching techniques are related to the method rather than the objective itself. Techniques focus on the practical aspects of how a method is implemented, emphasizing the psychological and logical aspects of teaching to make it more effective. While methods are concerned with the systematic planning of content, techniques focus on how to engage and impact students more effectively.

Meaning

The term "strategy" originally refers to the art of war, involving the planning and directing of large-scale military operations. According to the Collin's English Gem Dictionary (1968) and Encyclopaedia, strategy is defined as the science or art of planning and executing movements to achieve specific goals. In the educational context, strategy refers to the careful planning and execution of instructional activities to achieve desired learning outcomes. As B.O. Smith notes, strategy involves a pattern of actions designed to achieve specific objectives and to address potential challenges. Thus, effective teaching requires thorough pre-planning and the skillful application of strategies.

Stones & Morris describe teaching strategy as a generalized plan for a lesson that includes its structure, the desired learner behavior, instructional methods, and an outline of planned tactics. Unlike teaching methods, which focus primarily on content presentation, teaching strategies are more comprehensive. They encompass all elements of instruction, including content, task analysis, teaching objectives, anticipated changes in student behavior, and factors such as student interests, attitudes, abilities, and prior knowledge. According to I.K. Davis, teaching strategies are broad methods that incorporate educational philosophy, learning principles, desired activities, feedback, and motivational techniques.

Nature

Teaching strategies have several key characteristics:

- They are designed to specify the approach to teaching a particular lesson.
- They aim to achieve a set of defined teaching and learning objectives.
- They assist learners in reaching the desired learning outcomes.
- They provide a structured scheme or program that, if followed, can enhance the achievement of objectives.
- Effective teaching strategies involve well-planned tactics, making tactics an integral component.
- Strategies can be adjusted based on feedback from learners and changes in teaching objectives.
- They view teaching as a science and are inherently technical.
- Teaching strategies are broad, comprehensive, and adaptable to various situations.

Functions

The functions of teaching strategies include:

- Serving as a means to achieve teaching and learning objectives.
- Simplifying and concretizing the teaching and learning process for both teachers and learners.
- Creating a conducive teaching environment by analyzing and utilizing learning resources.
- Guiding the design of teaching aids, tactics, and methods.
- Addressing and overcoming obstacles to ensure an effective teaching and learning experience.

Check your progress

10. What are two key characteristics of teaching strategies?
11. According to B.O. Smith, what does the term 'strategy' refer to in an educational context?

3.4 Models of Teaching

Teaching models serve as the foundation for implementing teaching theories and are crucial for making instruction effective and engaging. They act as hypotheses for teaching theories and are developed based on learning theories, ensuring that teaching methods are grounded in proven educational principles. Teaching models are designed to create situations where student interactions occur, leading to the achievement of educational objectives and behavioral changes. Each teaching model includes a comprehensive and specific outline, grounded in verified principles.

The following six activities are integral to teaching models:

- Practical Application: Teaching models give practical shape to learning achievements, ensuring that the content is effectively conveyed and understood.
- Stimulus Selection: They involve selecting appropriate stimuli to elicit the desired responses from students.
- Situation Specification: Teaching models outline specific situations where student responses can be observed and assessed.
- Behavioral Criteria: They determine criteria to evaluate student performance and ensure that learning objectives are met.
- Strategy Specification: Models specify teaching strategies to achieve educational goals by analyzing classroom interactions.
- Strategy Modification: They include provisions for modifying strategies and tactics if the desired behavioral changes do not occur.

According to *Joyce and Weil,* a teaching model is a structured plan used to shape curriculum, design instructional materials, and guide classroom instruction. Hyman describes it as a framework for organizing, classifying, and interpreting instructional facts. Joyce and Weil also define teaching models as instructional designs that specify and produce environmental situations leading to specific behavioral changes in students.

Mr. Bruce R. Joyce emphasizes that teaching models, chosen and created by schools and individual teachers, play a crucial role in shaping educational experiences and enhancing the teacher's development.

Characteristics of Teaching Models

- Assumptions: Teaching models are based on fundamental assumptions, such as creating a suitable learning environment, facilitating teacher-student interactions, and employing effective teaching strategies. These assumptions form the basis for developing the model.

- Appropriate Experiences: Effective teaching models provide relevant experiences for both teachers and students, addressing the challenge of content presentation and ensuring effective learning.
- Fundamental Questions: Teaching models answer key questions about teacher behavior, the rationale behind it, and its effects on students, thus clarifying aspects of teaching and learning dynamics.
- Individual Differences: Models are designed with consideration for individual differences among students, influenced by various educational philosophies that emphasize different aspects of learning, such as rote memory or conceptual understanding.
- Student Interests: Good teaching models incorporate students' interests, as seen in Herbart's five-step pattern, which addresses students' engagement and motivation.
- Philosophical Influence: Teaching models are often shaped by the teacher's philosophical outlook, such as idealism or pragmatism, affecting how they aim to influence student behavior.
- Maxims of Teaching: Teaching models are grounded in educational maxims, which provide foundational principles for organizing and enhancing students' personalities.
- Practice and Concentration: The development of teaching models involves continuous practice and thoughtful consideration, ensuring that assumptions are clear and problems are effectively addressed.
- Development of Human Ability: Teaching models aim to develop human abilities and enhance teachers' social competencies, contributing to overall educational effectiveness.
- Teaching as an Art: Teaching models recognize teaching as an art, encouraging creative and effective teaching practices.

Fundamental Elements of Teaching Models

- Focus: Each teaching model has a specific objective or focal point around which it is developed. This focus defines the competencies and phases of the model.
- Syntax: The syntax of a teaching model involves organizing activities, tactics, and interactions in a sequence that helps achieve educational objectives effectively.
- Social System: Every teaching model includes a social system based on its focus. This system involves the interactions among students, teachers, and curriculum, creating an effective learning environment.
- Support System: Teaching models have a support system to evaluate the achievement of objectives through assessments. This system helps determine the effectiveness of the strategies and techniques used.

Types:

Teaching models can be categorized into various types based on their philosophical, psychological, and modern perspectives. Here is a detailed exploration of these categories:

1. Philosophical Teaching Models

Philosophical teaching models are grounded in philosophical perspectives on education. According to Israel Saffler, the following models are key examples:

The Impression Model of Teaching: This model operates under the assumption that a child's mind is initially blank, and learning occurs as experiences are imprinted onto it. The effectiveness of teaching in this model hinges on the teacher's ability to communicate effectively, emphasizing sensory experiences and language principles as critical for learning.

The Insight Model: Developed by Plato, this model counters the Impression Model by asserting that knowledge cannot be solely imparted through verbal instruction. Instead, it emphasizes the integration of mental processes and language. The Insight Model posits that understanding is enhanced when learners actively engage with content, rather than just receiving information passively.

The Rule Model: Proposed by Kant, this model focuses on the importance of logic and rules in education. It aims to develop students' capacities through structured logical processes, such as careful planning and organization of teaching activities. The Rule Model seeks to address the limitations of the Impression and Insight Models by emphasizing systematic rule-following and the cultivation of moral and cultural values.

2. Psychological Models

Psychological models of teaching are based on the principles of psychology and describe how teaching theories can be applied in practice. According to John P. Dececco, the following are notable psychological teaching models:

The Basic Teaching Model: Developed by Robert Glaser, this model incorporates psychological laws and principles and consists of four key elements:

Instructional Objectives: These are the goals set by teachers and pupils before instruction begins, defining what should be achieved.
Entering Behavior: This refers to the pre-existing knowledge and skills of students that are necessary for understanding new content.
Instructional Procedure: The methods and techniques used to present content and facilitate learning.
Performance Assessment: Evaluations that determine the extent to which students have achieved the instructional objectives, ensuring that assessments are valid and reliable.
The Computer-Based Teaching Model: Created by Lawrence Stuloro and Daniel Davis in 1965, this complex model uses computers to tailor instruction to students' needs. It includes elements such as entering behaviors, setting instructional objectives, and evaluating performance through computer-assisted teaching, which allows for simultaneous instruction and diagnosis.

The Teaching Model for School Learning: Developed by John Carroll, this model emphasizes accommodating the time needs of students. Key components include defining objectives in behavioral terms, focusing on intelligence and achievement, and providing sufficient time for learning according to individual needs.

The Interaction Model of Teaching: Also known as Flander's Ten Category System, this model by Neel A. Flander views teaching as an interactive process. It categorizes classroom behaviors into ten types and emphasizes analyzing teacher-student interactions. The model assesses objectives, entering behaviors, and the effectiveness of interactions through evaluation.

3. Modern Teaching Models

Bruce R. Joyce categorizes modern teaching models into four broad types, each reflecting different sources of influence:

Models Based on Social Interaction Source: These models emphasize social development and interpersonal relationships. Examples include:

- Classroom Meeting: Developed by William Glaser, this model fosters self-understanding and responsibility through structured discussions.
- Cooperative or Collaborative Learning: Promoted by authors like Johnson and Johnson, this model involves collective task arrangement and idea sharing to enhance learning outcomes.
- Jigsaw Model: Designed by Elliot Aronson, this model promotes interdependence among students by breaking tasks into parts that groups must assemble together.
- Role Playing and Sociodrama: These models encourage students to assume roles and act out scenarios to better understand concepts and social issues.

Models Based on Information Processing Source: These models focus on how information is processed and retained. Notable examples include:

- Advance Organizer Model: Designed by David Ausubel, this model helps increase information-processing efficiency through various types of organizers.
- Concept Attainment: Developed by Jerome Bruner, it focuses on inductive reasoning and conceptual development.
- Inquiry Training: Created by Richard Suchman, this model engages students in systematic inquiry and hypothesis development.

Models Based on Personal Source: These models emphasize personal development and self-awareness. They include:

- Nondirective Teaching: Based on Carl Rogers' work, this model promotes self-awareness and autonomy, encouraging students to explore ideas and make decisions.

- Developing Positive Self-Concepts: Focuses on enhancing students' self-esteem and confidence through moral and personal development.
- Relaxation and Stress Reduction: Various models use relaxation techniques to address anxiety and improve learning environments.

Models Based on Behavioral Modification Source: These models focus on changing behavior through reinforcement and structured learning activities. Examples include:

- Desensitization: Aims to replace anxieties with relaxation techniques.
- Direct Teaching and Training: Involves structured instruction and skill development.
- Behaviorism: Emphasizes observable behaviors and reinforcement in learning processes.

Check your progress

12. What is the purpose of teaching models in education?
13. Name one key activity integral to teaching models.
14. Who developed the Insight Model of teaching?
15. What does the Rule Model of teaching emphasize?
16. Who created the Advance Organizer Model?
17. Which model uses computers to tailor instruction to students' needs?

3.5 Modification of teaching behavior

Teachers are the backbone of society as they provide education to the future citizens of the country through their proper instructional activities and behavioral patterns. It is very essential that teachers must be effective to perform adequate behavior to achieve teaching-learning objectives. However, if a teacher shows inadequate behavioral sequences in the classroom, the teaching-learning objectives cannot be achieved. Hence, while preparing teachers through pre-service and in-service teacher education, it is needed to implement proper techniques to modify a teacher's incompetent behavioral pattern into a more refined one.

Behavior is defined as something a person does in a particular situation. Behavior may be increased by following the behavior with a favorable consequence or positive reinforcement.

Teacher behavior is defined as the behavior or activities of persons as they go about doing whatever is required of teachers, particularly those activities that are concerned with the direction of guidance of the learning of others. An implication of this definition is that teacher behavior is social behavior. Not only do teachers influence student behavior, but students influence teacher behavior as well. Teaching is an intimate contact between a teacher, a more mature personality, and a student, a less mature personality. In the process of education, the teacher helps in developing the student's personality by this intimate contact.

Behavior Modification: Behavior Modification is a discipline that makes use of learning principles to help pupils cope with or cure a wide range of psychological problems.
In teacher training and in-service programs, the primary goal is to enhance and refine the existing teaching behaviors and communication skills of educators. This enhancement is achieved through a combination of theoretical knowledge and practical application, aimed at improving both pre-service and in-service teachers' effectiveness in the classroom. The focus of these programs is on modifying teaching practices and communication strategies to better interact with students and foster a more conducive learning environment.

Teacher behavior encompasses both verbal and non-verbal communication demonstrated by educators during their instructional activities. This behavior plays a crucial role in shaping students' learning experiences and outcomes. Modifying and improving teacher behavior involves adopting various techniques and innovations to enhance the existing teaching methods and communication strategies. The objective is to transition from initial (entry) behaviors to more effective (terminal) behaviors, ensuring that educators can perform their professional duties with greater efficacy.

Several techniques are employed to achieve these modifications, including:

- **Microteaching:** This technique involves practicing teaching skills in a controlled, small-scale setting. Teachers deliver a short lesson to a small group, receive feedback, and refine their skills based on observations and critiques. It allows educators to focus on specific teaching behaviors and receive immediate, actionable feedback.
- **Flanders' Interaction Analysis Category System:** This system provides a structured method to analyze classroom interactions between teachers and students. By categorizing and observing communication patterns, educators can gain insights into their teaching style and identify areas for improvement.
- **Simulation:** This technique involves creating realistic teaching scenarios where teachers can practice and refine their skills. It offers a safe environment to experiment with different teaching strategies and receive constructive feedback.

Principles of behavior modification:

- **Reinforcement of Behavior:** Behavior that is positively reinforced or rewarded is more likely to recur when the same stimulus or situation arises in the future.
- **Behavior Recurrence:** The likelihood of a behavior recurring increases when it has been consistently elicited by a particular stimulus or situation.
- **Feedback Utilization:** Providing feedback on specific behaviors helps reinforce desired actions and correct undesired ones, thereby facilitating behavioral improvement.

- **Consistency:** Consistent application of reinforcement or corrective feedback ensures that desired behaviors are reliably strengthened and undesired behaviors are diminished.
- **Behavioral Observation:** Observing and analyzing behavior in various contexts helps identify patterns and areas for improvement, which can be addressed through targeted interventions.
- **Incremental Changes:** Gradual, step-by-step modifications are more effective than abrupt changes, allowing for manageable adjustments and reinforcement of new behaviors.
- **Specificity:** Clear and specific feedback on particular behaviors helps educators understand what actions need to be modified or maintained, leading to more effective behavior change.

Check your progress

18. What is the main goal of behavior modification in teacher training programs?
19. What does Flanders' Interaction Analysis Category System help educators analyze?
20. What principle of behavior modification suggests that behavior is more likely to recur if it has been consistently elicited by a particular stimulus?

3.6 Micro Teaching

Microteaching was first introduced at Stanford University, USA in 1963. The Stanford teacher education program staff members sought to identify, isolate, and build training programs for critical teaching skills. There are general teaching skills that can be applied at many levels for teaching many different subjects. Microteaching has since then been refined and applied not only in teacher training but also in business, nursing, and the army. Research in India and other developing countries has shown that conventional microteaching methods help to improve teaching competencies.

The teacher in the classroom uses several techniques and procedures to bring about effective learning in his/her students. These activities include introducing, demonstrating, explaining, or questioning. The teacher could make use of non-verbal behaviors such as smiling, gesturing, and nodding. These groups of activities are called teaching skills. The teacher trainee is introduced to a wide range of teaching skills. Microteaching allows the teacher trainee to practice any one skill on his/her own and then combine it with others when it has been mastered.

Definitions

- Allen D.W and Eve, A.N. (1968) defined microteaching as "a system of controlled practice that makes it possible to concentrate on specific teaching behavior and to practice teaching under controlled conditions."
- Allen, D.W (1966) defined microteaching as "a scaled-down teaching encounter in class size and class time."

- ❖ Buch, M.B (1968) defined microteaching as "a teacher education technique which allows teachers to apply clearly defined teaching skills to carefully prepared lessons in planned series of 5 to 10 minutes. It encounters with a small group of real students, often with an opportunity to observe the results on videotape."
- ❖ Passi, B.K (1976) writes that "the most important point in microteaching is that teaching is practiced in terms of definable, observable, measurable, and controllable teaching skills."

A composite definition of microteaching technique would be: Microteaching is a teacher training technique involving a specific teaching behavior/skill for a short duration of 5 to 6 minutes for a small class comprising 5 or 6 fellow teacher trainees/peer group on a single concept of subject matter.

Characteristics of Microteaching

- In microteaching, the trainee can concentrate on practicing a specific, well-defined skill.
- Microteaching provides for pinpointed immediate feedback.
- As microteaching is scaled down teaching, there is no problem of discipline.
- Less administrative problems arise as teaching sessions are organized with peers.
- Microteaching provides an opportunity to undertake research studies with better control over conditions and situations.
- Microteaching can be used as an integral part of teacher training in India as sophisticated gadgetry is not a must.

Meaning

Microteaching represents an appropriate innovative technique for helping pupil teachers being trained in colleges of education in their acquisition of the desired teaching skills. We can define microteaching as a sort of specialized training technique that provides appropriate opportunities to the pupil teachers for the practice and development of some specific teaching skills by organizing teaching in its micro form—miniature in terms of class size, time duration, and content to be covered. It is a device of imparting training to the inexperienced or experienced teachers for learning the art of teaching by practicing specific skills through a "scaled-down teaching encounter," i.e., reducing the complexities of real normal teaching in terms of class size, time, and content.

The use of micro-teaching technique in reference to the teacher education program adopted in our country may prove advantageous due to the specific features and characteristics inherent in this technique, such as:

- Non-dependence on practicing schools and their students for the practice of skills.
- Providing opportunities for the practice of one teaching skill at a time.
- Reducing the complexities of normal classroom teaching.
- Providing appropriate opportunities for systematic observation of teaching and immediate feedback to bring improvement in one’s teaching skill.

- Providing opportunities to the teacher trainees for the development of their teaching skills in laboratory-like controlled conditions.

Microteaching is a method which enables teacher trainees to practice a skill by teaching a short lesson to a small number of pupils. Usually, a micro lesson of 5 to 10 minutes is taught to four or five fellow students. A supervisor, using an appraisal guide, usually rates the lesson and then discusses it with the teacher trainee. Where closed-circuit television (CCTV) is available, the appraisal guide may be redundant. The teacher trainee may alter his/her approach if necessary and later re-teach the lesson to another group of pupils. This lesson is also rated by the supervisor and then analyzed and discussed with the teacher trainee.

The Steps in a Microteaching Session

- PLANNING: This involves selection of the skill to be practiced, awareness of components of the skill, selection of a suitable concept, writing of a micro lesson with specific objectives.
- TEACHING: The following setting is suggested for the microteaching technique.

Time: 5 minutes

Students: Peer group—5 or so in number

Supervisors: 1 or 2

If possible, use of CCTV facility could be made to enable the teacher trainee to get a first-hand look at his weaknesses.

FEEDBACK: This is a vital aspect of the microteaching cycle. To be effective, it must be clearly related to the model of the teaching skill used. Appraisal guides add to the comments of the supervisor and fellow students; they focus the feedback on specific behaviors and can be used for the analysis session or be just given to the teacher trainee with a written comment or rating of his/her skill performance.

REPLAN: Keeping in mind the feedback received from the supervisor, the teacher trainee replans his/her micro lesson, writing another micro lesson plan or editing the existing one.

RETEACH: The teacher trainee re-teaches, incorporating the suggested changes with the same students or another group of 5 students. The supervisor checks to see whether there is any improvement in skill attainment.

REFEEDBACK: The supervisor assesses the lesson again, pointing out the improvements and lapses.

Indian Model of Microteaching

The micro lesson is taught/demonstrated under normal conditions with minimum electronic gadgetry; available infrastructure (space, material, and equipment) is used as the microteaching laboratory.

Immediate feedback is provided to the trainee teacher by the observers.

The duration of the microteaching cycle is as follows:

Teaching: 6 minutes

Feedback: 6 minutes

Replan: 12 minutes

Reteach: 6 minutes

Refeedback: 6 minutes

Total

The effective modification and enhancement of teacher behavior are central to achieving optimal teaching and learning outcomes. The use of innovative techniques such as Microteaching and Flanders' Interaction Analysis represents a significant advancement in teacher education. Microteaching, with its focused approach on specific teaching skills and immediate feedback, allows teachers to practice and perfect individual aspects of their teaching in a controlled environment. Meanwhile, Flanders' Interaction Analysis offers a systematic method to observe, categorize, and improve classroom interactions, fostering a more interactive and participatory teaching approach.

Together, these techniques address the multifaceted nature of teaching behaviors, providing educators with the tools necessary to adapt and improve their instructional practices. By incorporating these methods into teacher training programs, we can better equip teachers to meet the diverse needs of their students and enhance the overall quality of education. The ongoing refinement of teacher behaviors through such targeted strategies ultimately contributes to more effective teaching, leading to better educational outcomes and a more profound impact on students' academic and personal growth.

Check your progress

21. Define Microteaching according to Allen D.W (1966).
22. What is one of the characteristics of Microteaching?
23. What is the duration of the feedback phase in the Indian model of Microteaching?

3.7 Let us Sum up

In this unit, we have explored various levels of teaching, including memory, understanding, and reflective levels. We have gained insights into different teaching strategies and their characteristics. Additionally, we examined philosophical, psychological, and modern models of teaching in detail. We learned about methods to modify teacher behavior through techniques such as microteaching, Flanders' Interaction Analysis, and simulation. Overall, this unit aims to motivate you to effectively design instructional material and implement teaching strategies that align with the appropriate teaching levels and models, ultimately promoting advancements in educational technology.

3.8 Further Reading

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3.9 Answer to check your progress

1. The primary focus is on systematic repetition and memorization of facts to enhance knowledge retention and recall.
2. The Learning phase.
3. Immediate memory is the type of memory that allows individuals to recall information shortly after learning it, typically lasting for a few seconds to a minute.
4. One characteristic of a good memory is rapidity in learning.
5. Recognition involves identifying previously encountered objects or individuals, while recall involves retrieving learned material from memory.
6. The primary focus is on helping students grasp generalizations, principles, and facts, emphasizing content mastery and intellectual behavior development.
7. The first step is Exploration, which involves testing prior knowledge and organizing content logically.
8. The three objectives are developing problem-solving competency, critical and constructive thinking, and independent and original thinking power.
9. The reflective-level teaching environment is open and student-centered, encouraging active participation and independent problem-solving.
10. Teaching strategies are broad and comprehensive, and they can be adapted based on learner feedback and changing objectives.
11. In an educational context, 'strategy' refers to a pattern of actions designed to achieve specific educational objectives and to address potential challenges.
12. To implement teaching theories effectively and make instruction engaging and grounded in educational principles.

13. Practical Application.
14. Plato.
15. The importance of logic and rules in education.
16. David Ausubel.
17. The Computer-Based Teaching Model.
18. The main goal is to enhance and refine existing teaching behaviors and communication skills of educators.
19. It helps analyze classroom interactions between teachers and students by categorizing and observing communication patterns.
20. The principle of Behavior Recurrence.
21. Microteaching is a "scaled-down teaching encounter in class size and class time."
22. Microteaching allows the trainee to practice a specific, well-defined skill.
23. The feedback phase in the Indian model of Microteaching lasts 6 minutes.

3. 10 Model questions

1. What are the three levels of teaching and how do they impact teaching practices? Illustrate each level with examples.
2. Describe the phases of memory: learning, retention, recall, and recognition. How can educators enhance each phase in memory-level teaching? Provide examples.
3. Outline Morrison's Teaching Model for understanding-level teaching, including the steps of exploration, presentation, assimilation, organization, and recitation. How does each step contribute to deep learning?
4. Discuss Hunt's Model of Reflective-Level Teaching, focusing on its key components such as focus, syntax, social system, and support system. How does this model encourage problem-solving and critical thinking?
5. Compare teaching methods and techniques. How do teaching strategies combine both to meet educational goals? Explain the nature and functions of teaching strategies.
6. What are the key characteristics and functions of teaching strategies? How do they help achieve teaching and learning objectives? Discuss their importance and adaptability with examples.
7. How do teaching models support the implementation of teaching theories and enhance instructional effectiveness? Explain with examples.
8. Describe the six key activities integral to teaching models and their significance in achieving educational objectives.
9. What are the main characteristics and functions of teaching models, and how do they influence the teaching and learning process?
10. Compare the philosophical teaching models: Impression, Insight, and Rule Models. How do these models differ in their approach to education?
11. Explain the Basic Teaching Model and its key components. How does this model incorporate psychological principles into teaching practice?
12. Discuss the principles of behavior modification in teacher training programs. How do these principles help in refining teaching behaviors?

13. Outline the microteaching technique and its key features. How does microteaching contribute to the development of specific teaching skills?
14. Describe the steps involved in a microteaching session and the role of feedback in this process. How does microteaching facilitate the improvement of teaching practices?
15. Discuss the role and impact of modern teaching models, including those based on social interaction, information processing, personal development, and behavioral modification. How do these models address different aspects of teaching and learning?

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UNIT-IV
Programmed Instruction

Unit Structure

4.0 Learning Objectives

- ✓ To understand the concept and origin of programmed instruction.
- ✓ To differentiate between linear and branching types of programmed instruction.
- ✓ To develop skills for creating programmed instructional material.
- ✓ To explore the role of teaching machines in education.
- ✓ To evaluate the impact of computer-assisted instruction on learning.

4.1 Introduction

An educational technologist must be adept at creating self-instructional materials that effectively take on the role of a teacher. Previously, we explored various theories, models, and strategies of teaching and communication. These principles can be integrated into both software and hardware components of educational technology to enhance the learning process. By systematically organizing concepts, educational technologists can develop relevant and efficient learning resources for students, a process known as programmed instruction.

4.2 Origin of Programmed Instruction

Programmed instruction is a significant innovation in individual learning, allowing learners to control the process without an instructor. It serves as a self-learning strategy by providing materials in printed or digital form, designed to support individual learning at the learner's own pace. This method is particularly beneficial for distance or open learning,

offering advantages like drill, practice, self-evaluation, and motivation. It presents new content in a structured, sequential manner.

Programmed instruction originated from behaviorist B.F. Skinner's work in the mid-1950s. His system allowed learners to use specially prepared books or devices to learn independently. This method aimed to relieve teachers from repetitive tasks in subjects like spelling and arithmetic. Skinner's approach was based on operant conditioning, which posits that learning occurs through reinforcement. Early methods involved students answering questions via machines, advancing only upon correct responses, thus providing immediate and individual reinforcement.

This approach quickly gained popularity, leading to extensive research and commercial production of programmed instructional materials, laying the groundwork for modern computer-assisted learning.

Skinner's Operant Conditioning

Skinner's theory emphasizes that learning involves behavioral changes in response to stimuli, which can be conditioned through positive reinforcement. Key principles include:

- Behavior reinforced positively will likely reoccur; intermittent reinforcement is highly effective.
- Information should be presented in small amounts to reinforce responses ("shaping").
- Reinforcement will generalize across similar stimuli, leading to secondary conditioning.
- Teaching should not rely on punishment.

Definitions

- ❖ J.E. Espich and Bill Williams (1967): Programmed instruction is a planned sequence of experiences that effectively build proficiency through stimulus-response relationships.
- ❖ Susan Markle (1969): It is a method of designing reproducible instructional sequences to produce measurable, consistent effects on student behavior.
- ❖ N.S. Mavi (1984): It involves converting live instructional processes into self-learning materials in micro sequences, enabling learners to respond, correct errors, and master concepts.

Learning Components of Programmed Instruction

- Carefully Designed Courses with Predefined Sequences

Programmed instruction involves meticulously planned courses where content is arranged in a logical sequence. This ensures a coherent flow of information, guiding learners step-by-step through the material, which enhances comprehension and retention.

- Small Units of New Information ("Shaping")

Content is divided into small, manageable units or frames. This approach, known as shaping, helps learners focus on one concept at a time, reducing cognitive load and making complex information more accessible.

- Immediate Feedback for Reinforcement

Learners receive instant feedback on their responses. This immediate reinforcement helps correct misunderstandings promptly and reinforces correct answers, which encourages continued engagement and motivation.

- Progression Based on Correct Answers

Learners advance through the material only after providing correct responses. This ensures that they fully grasp each concept before moving on, promoting mastery and preventing gaps in understanding. This adaptive approach caters to individual learning needs and paces.

Principles of Programmed Instruction

1. Small Steps

Programmed instruction breaks down content into small, manageable units called frames. Each frame presents a small amount of new information, making it easier for learners to understand and absorb the material gradually.

2. Active Responding

Learners actively engage with the material by responding to questions or tasks after each frame. This interaction ensures that learners are not passive recipients but active participants, enhancing retention and understanding.

3. Immediate Reinforcement

Feedback is provided immediately after a response is made. If the response is correct, learners are rewarded with positive reinforcement, which encourages continued engagement. Incorrect responses are corrected instantly, helping learners adjust and improve.

4. Self-Pacing

Learners progress through the material at their own pace, allowing them to spend more time on challenging sections and move quickly through easier ones. This personalized approach respects individual learning speeds and styles.

5. Student Testing

Regular assessments are integrated within the instruction to evaluate learner understanding continuously. This ensures that learners achieve mastery of each concept before proceeding, maintaining high standards of comprehension.

Nature

- Content is divided into sequential frames requiring frequent responses.
- Learners receive immediate feedback and self-correct errors.
- Materials undergo trials and revisions for effectiveness.
- Students advance without fear, promoting a positive learning environment.
- Objectives are clearly defined, fostering interaction and continuous evaluation.

Advantages

- Enhances critical thinking and judgment.
- Enables rapid learning of large content.
- Encourages independent study without traditional class constraints.
- Improves education quality through personalized learning.
- Supports distance learning and addresses individual learning issues.

Disadvantages

- Limits creativity and originality.
- Time-consuming to develop materials.
- Primarily benefits individual learning, potentially isolating students.
- Reduces teacher-student interaction.
- Immediate doubt resolution is limited compared to traditional methods.

Check your progress

1. Who developed the concept of programmed instruction?
2. What type of reinforcement is central to Skinner's operant conditioning in programmed instruction?
3. What does the principle of 'small steps' in programmed instruction involve?

4.3 Types of programmed Instruction -Linear and Branching

Programmed instruction is a method of teaching that uses carefully structured materials to guide learners through content. Two main types of programmed instruction are:

I. Linear Programming
II. Branching Programming

Linear Programming: Linear programming, developed by B.F. Skinner, uses operant conditioning principles to present content in a series of small, sequential steps called frames. Each frame includes a question, and learners receive immediate feedback, promoting reinforcement and gradual mastery.

Characteristics:

- Sequential Learning: Learners move through content in a fixed order, ensuring a logical progression from one concept to the next.
- Small Steps: Information is broken down into manageable units, making it easier to digest and understand.
- Immediate Feedback: Learners receive instant reinforcement for correct responses, which helps solidify understanding and correct errors quickly.
- Self-Pacing: Students can move through the material at their own pace, allowing for individualized learning experiences.

Principles:

- **Small Steps:** The content is divided into small increments, allowing learners to build knowledge gradually.
- **Active Responding:** Learners are actively engaged by responding to questions, enhancing retention and understanding.
- **Immediate Confirmation:** Feedback is given right away, reinforcing correct answers and guiding learning.
- **Self-Pacing:** Learners can progress through the material as quickly or slowly as they need, tailoring the learning experience to their individual needs.

Applications

Linear programming is versatile and can be used across educational levels. It is particularly effective for:

- **Distance Learning:** Allows learners to study independently and progress at their own pace.
- **Remedial Instruction:** Provides targeted practice and reinforcement to help struggling students catch up.
- **Individualized Learning:** Supports personalized learning paths based on the learner's pace and understanding.

Limitations:

- **Lack of Freedom:** The fixed path restricts exploration and independent thought, which can limit creative problem-solving.

- **Animal-Based Theories:** Originating from experiments with animals, the approach may not fully account for human cognitive complexity.
- **Uniform Path:** All learners follow the same sequence, which might lead to cheating or disengagement if the pace or content does not match individual needs.

Linear programming provides a structured and systematic approach to learning, focusing on reinforcement and gradual progression. However, its rigidity may not suit all learning styles or subjects.

Branching Programming: IT is developed by Norman A. Crowder, branching programming offers a flexible learning approach. Learners choose from multiple-choice questions, leading them to different pathways based on their responses. Correct answers direct them to new material, while incorrect answers provide remediation.

Characteristics:

- Complex Structure: Uses larger frames with multiple pathways, allowing for a more personalized learning experience.
- Exposition-Diagnosis-Remediation: This framework addresses individual learner needs by presenting content, diagnosing errors, and offering corrective feedback.
- Error Diagnosis: Mistakes help identify weaknesses, enabling targeted remediation to improve understanding.

Principles:

- **Exposition:** Presents the full content to learners, ensuring they have the complete information needed for understanding.
- **Diagnosis:** Analyzes errors to pinpoint learning gaps, helping tailor subsequent instruction to the learner's needs.
- **Remediation:** Provides corrective feedback for wrong answers, guiding learners back to the correct path.
- **Democratic Learning Environment:** Offers learners some control over their learning path, fostering engagement and autonomy.

Applications:

Ideal for secondary and higher education, branching programming supports complex learning objectives and accommodates individual learner differences.

Limitations:

- Focus on Remediation: Emphasizes error correction over initial teaching, which might lead to frustration.

- Non-Sequential Navigation: The non-linear structure can be challenging for some students to follow.
- Lack of Motivation: Repetitive error correction may decrease engagement and motivation.

4.4 Development of Programmed Instructional Material

- **Phases:**
- **Preparatory Phase:** Topic Selection
  Choose a relevant topic and outline the content.
- **Objective Definition:** Clearly define learning objectives and prerequisites.
- **Test Design:** Create pre-tests and post-tests to measure learning outcomes.
- **Writing Phase- Frame Creation:** Present content in frames, each containing prompts and required responses.
- **Active Response:** Encourage learners to actively participate and engage with the material.
- **Feedback:** Provide immediate confirmation or correction to reinforce learning.
- **Sequencing:** Carefully order frames to ensure logical and coherent progression.
- **Validation Phase:**
- **Try-Outs:** Conduct individual and group trials to test the material.
- **Revisions:** Revise content based on feedback and prepare the final version.

4.5 Teaching Machines

History: Sydney L. Pressey invented the first teaching machine, aiming to automate testing and teaching. Later, B.F. Skinner enhanced the concept by focusing on structured learning sequences and immediate feedback, integrating principles of operant conditioning.

Functionality: Teaching machines present programmed content where students must respond to prompts. Correct answers allow them to advance, while incorrect answers prompt review, ensuring mastery before moving forward.

Types:

Adjustive Machines: These machines provide feedback on multiple-choice questions, acting as supplements to traditional instruction. They help reinforce concepts and assess understanding.

Linear Machines: Linear machines follow a straightforward, fixed sequence of instructional content, ensuring that all learners progress through the same material in the same order. This helps reinforce foundational knowledge before advancing.

Branching Machines: Branching machines offer multiple learning paths based on students' responses, allowing for tailored instruction. This personalization helps address individual learning needs and styles.

Features:

Question Display: Clearly presents questions and problems, ensuring learners understand what is being asked and can focus on the task at hand.

Active Response: Encourages learners to engage actively with the material, reinforcing learning through participation and interaction.

Immediate Feedback: Provides instant confirmation or correction, which helps learners quickly understand mistakes and reinforces correct responses, enhancing learning efficiency.

Check your progress

4. What is a key characteristic of linear programming in programmed instruction?
5. What does the term 'Error Diagnosis' refer to in branching programming?
6. Who developed branching programming,

4.6 Computer Assisted Instruction

Use of Computers in Education

The integration of computers in education began in the 1960s and expanded with the introduction of microcomputers in the 1970s. Today, computers are widely used in all educational levels, from primary to university, and even in some preschool programs. They play two main roles:

- Data Presentation: Computers provide straightforward presentations of information.
- Tutorial Role: Computers test students' comprehension through interactive programs that offer immediate feedback.

Computer-Assisted Instruction (CAI)

CAI is an interactive teaching method that uses computers to deliver instructional material and track learning progress. It incorporates text, graphics, sound, and video to enhance the educational experience. CAI allows students to learn independently, progressing at their own pace, and is used across various subjects.

Types of CAI

- Drill-and-Practice: Provides repeated practice of skills for mastery.
- Tutorials: Offer information and guide learners through exercises, testing their understanding.
- Games: Use competition to engage students and reinforce knowledge.
- Simulations: Create realistic scenarios for experiential learning, useful in fields like pilot training.
- Discovery: Encourages exploration and critical thinking through databases.
- Problem Solving: Helps develop strategies and skills in students.

Advantages of CAI

- One-to-One Interaction: Offers personalized attention and immediate feedback, allowing students to progress at their own pace.
- Motivation: Engaging multimedia content keeps students interested and motivated to learn.
- Independence: Encourages self-directed learning, enabling students to choose when, where, and what to study.
- Efficiency: Frees up teacher time for individual attention, as computers handle repetitive drills.

Limitations of CAI

- Overwhelm: Students may feel overloaded with information and resources.
- Technical Challenges: Equipment malfunctions can disrupt learning and create negative attitudes toward CAI.
- Cost: High expenses for purchasing, maintaining, and updating technology.
- Human Interaction: Potential reduction in teacher-student interaction.
- Courseware Development: Creating or adapting software to meet specific needs can be complex, expensive, and time-consuming.

Despite these challenges, CAI is evolving with adaptive educational systems, offering more personalized learning experiences.

Check your progress

7. What does CAI stand for?
8. What are the two main roles of computers in education?
9. What is one limitation of CAI?

4.7 Researches in E T

Research Focus: The primary focus is on developing practical tools for teaching Computer Science at the university level. This includes creating innovative methods and resources to enhance the teaching and learning process. Additionally, there is a commitment to exploring computer-based learning environments applicable to various educational contexts.

Current Projects

Research projects are centered on:

- Peer Assessment: Developing tools that enable students to evaluate each other's work, promoting collaborative learning and critical thinking skills.
- Plagiarism Detection: Creating advanced systems to identify and prevent academic dishonesty, ensuring the integrity of student work.

- Automated Submission and Assessment: Building platforms that automate grading and provide instant feedback, improving efficiency for educators and students alike.

Other initiatives include designing agent-based pedagogic architectures, which utilize intelligent agents to personalize and enhance the learning experience, and leveraging learning objects—modular educational resources that can be used and reused across different courses.

A significant theme in this research is understanding how different programming paradigms influence the support computers offer for constructionist learning, where learners build knowledge through exploration and experimentation.

Key parts

- Automated Assessment: Enhancing the accuracy and efficiency of evaluating student performance through technology.
- Computer Science Education: Innovating teaching methods to improve comprehension and engagement in computer science.
- Mobile Learning: Utilizing mobile devices to facilitate learning anytime and anywhere, increasing access and flexibility.
- Plagiarism Detection: Advancing tools to uphold academic standards and ethical practices in education.
- Supporting Technologies: Developing foundational technologies that underpin educational innovations.

While there is extensive research on the impact of new technologies in education, there is a lack of large-scale, rigorous data. Much of the existing research is funded by tech companies, raising concerns about objectivity. Comprehensive studies that yield valuable insights often take years, trailing behind rapid technological advancements.

Case Studies and Trends

- Mobile Learning: Although widespread, empirical data on its effectiveness is limited. Small pilot studies indicate potential benefits in enhancing student engagement and learning outcomes.
- Project RED: Identifies that many schools do not fully exploit digital tools. The study outlines critical steps for maximizing the benefits of educational technology, such as integrating technology into daily instruction and providing ongoing teacher training.
- U.S. Department of Education Meta-Analysis (2010): Concluded that online learning is slightly more effective than traditional methods, with blended learning showing the most promise. However, it highlights the need for more K-12-focused research.
- Speak Up Survey: Reflects a growing interest in mobile and online learning among educators and students, with an increasing number of students owning mobile devices, regardless of socioeconomic status.

E-Learning

E-learning is rapidly expanding, offering various formats:

- Virtual Schools: Provide full-time online education options, featuring virtual teachers and a mix of synchronous (live) and asynchronous (self-paced) learning experiences. These schools are addressing socialization by organizing in-person events and activities.
- Blended Learning: Combines online resources with face-to-face instruction, offering flexibility and personalized learning paths. It's particularly effective in accommodating different learning styles and needs.
- Credit Recovery: Online courses designed to help students retake failed classes, allowing them to focus on areas they struggle with while bypassing familiar content. While effective, the academic rigor of these programs varies.
- Schools often source online courses from state virtual schools or develop their own to ensure alignment with state standards.

Mobile Computing

The proliferation of mobile devices in education is driven by:

- Increased Access: Mobile technology helps bridge the digital divide, providing learning opportunities to a wider audience.
- Affordability: Decreasing costs make mobile devices more accessible to schools and students.
- Game-based learning is anticipated to become mainstream, offering engaging and interactive ways for students to learn. Funded projects like Crystal Island and the River City Project demonstrate the potential of educational games to simulate real-world challenges, especially in STEM fields.

Challenges

Developing high-quality educational games requires significant investment in terms of time and resources. Additionally, training teachers to effectively use game-based learning tools remains a hurdle for many educational institutions.

Social Networking in Education

Social networking is increasingly integrated into educational settings:

- Mainstream Platforms: Used for communication and collaboration, facilitating both academic and extracurricular activities.
- Educational Networks: Platforms like ePals offer a controlled environment focused on learning, allowing teachers to manage interactions and ensure student safety.
- Professional Development: Educators use networks like Ning and Twitter to share resources, ideas, and best practices, fostering a global community of learning.

Web 2.0 tools, such as wikis and blogs, enable students to collaborate and share their work, while services like Skype and Voice Thread provide avenues for global interaction and multimedia presentations, enriching the learning experience beyond traditional classroom boundaries.

Check your progress

10. What is the primary focus of the research discussed?
11. Name one current project focused on academic integrity.
12. What is a major driver for the use of mobile devices in education?
13. Which tool allows students to collaborate and share their work online?
14. What type of learning combines online resources with face-to-face instruction?

4.8 Let us sum up

In this unit you have gone through the concept, origin technique and procedure of designed programmed instructional material both in linear type as well as in branching type. You got a detail idea about the principles, steps, advantages of programmed instruction. Teaching machine concept also has been outlined. Further the current research in educational technology and future priorities in this field has been exposed. We hope that this unit will assist you to design self-instructional materials as well as motive you to conduct research in this area.

4.9 Further Reading

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4.10 Answer to check your progress

1. B.F. Skinner developed programmed instruction, emphasizing operant conditioning.
2. Immediate feedback is central, providing reinforcement after each response.
3. Breaking content into small, manageable units called frames for easier understanding.
4. Sequential Learning: Learners progress through content in a fixed order.
5. It refers to identifying learning weaknesses through mistakes and providing targeted remediation.

6. Norman A. Crowder developed branching programming
7. Computer-Assisted Instruction.
8. Data presentation and tutorial role.
9. High cost of purchasing and maintaining technology.
10. Developing practical tools for teaching Computer Science at the university level.
11. Plagiarism Detection.
12. Increased Access.
13. Wikis and blogs.
14. Blended Learning.

4.10 Model Questions

1. Discuss the historical development of computer use in education. How did the introduction of microcomputers in the 1970s influence teaching methods and learning environments across different educational levels?
2. Explain the role and impact of Computer-Assisted Instruction (CAI) in modern education. What are the different types of CAI, and how do they enhance the learning process for students?
3. Evaluate the advantages and limitations of Computer-Assisted Instruction (CAI). How do personalized interaction, motivation, and independence compare against potential challenges like information overload and technical issues?
4. Analyze the current research focus on practical tools for teaching Computer Science at the university level. How do tools for peer assessment, plagiarism detection, and automated submission contribute to improving educational outcomes?
5. Discuss the significance of developing agent-based pedagogic architectures and learning objects. How do these innovations support personalized learning and modular educational resources?
6. Examine the influence of different programming paradigms on constructionist learning approaches. How can varying programming models impact the effectiveness of constructionist education methods?
7. Assess the growth and challenges of mobile learning technologies in educational settings. What strategies can be employed to effectively integrate mobile devices into teaching and learning practices?
8. Critique the impact of industry-funded research on the validity and objectivity of educational technology studies. How can researchers address concerns regarding the influence of funding sources on research outcomes?
9. Review the findings from Project RED regarding the integration of digital tools in K-12 education. What steps are essential for schools to fully leverage technology and maximize its potential benefits?
10. Compare the effectiveness of online-only instruction, blended learning, and traditional face-to-face instruction based on the U.S. Department of Education's meta-analysis. What implications do these findings have for K-12 education?

11. Explore the expansion of e-learning, focusing on the roles of virtual schools and credit recovery programs. What are the benefits and potential issues associated with these educational models?
12. Discuss the potential and challenges of game-based learning and simulations in education. How can these tools support STEM education, and what are the difficulties in creating and implementing effective educational games?

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