Educational Technology Paper X

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Unit 1

Concept of Educational Technology

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Structure

1.0Introduction

This is the era of technology where we are utilizing scientific techniques for solving problems and improving the life. However for acquiring education also we are implementing technology to make teaching learnig easier, simple, and comprehensive. This technology is known as educational technology which is saving time and energy and assisting learner progressively.

As it is the first unit of course we are making this chapter comprehensive to make you understand the meaning, scope m, significance and components of educational technology

1.1 Objectives

After going through this unit , you will be able to

- Define educational technology
- Explain the scopes and significance of educational technology
- Differentiate Hardware and software
- Identify gardware and software in educational technology.
- Distinguish Educational Technology and Instructional 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 Sisya 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 a solves the problems. Hence technology is applied for human development and worked as a problem solving inventions.

Educational Technology

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;

1. Technology in education

2. 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) analysis of instructional tasks/challenges and setting the educational objectives

(ii) selection and construction of suitable machine, tools, instrument

(iii) selection and use of appropriate techniques to run the machine/devices to achieve the educational objective

(iv)Integration of scientific and technological skills/ techniques with appropriate behavioral outcome

There have been several definitions of educational technology developed over time. Let us go through them to get the better understanding on the term “educational Technology”

.Educational technologyis the development, application and evaluationof systems, techniques and aids to Improve human learning .(National Council for Educational Technology for the United Kingdom (NCET, 1967).

It is the application of modern skills and techniques to the requirement of education and training. (Derik Unwin , 1969).

Educational technologyis an applicationof scientific knowledgeabout learning and conditions of learning to improve the effectiveness and efficiency of teaching and learning. (Leith, 1975)

Robert A. Cox

"Educational Technology is the application of scientific process to man's learning conditions."

John P. Dececco

"Educational Technology is the form of detailed application of psychology of learning to practical teaching problems"

E.E. Hadden

"Educational Technology is that branch of educational theory and practice concerned primarily with the design and use of messages which control the learning process."

Richmond, "Educational Technology is concerned to provide appropriately designed learning situations which, holding in view of objectives of the Teaching of Training, being to bear the best means of instruction."

S.S. Kulkarni, "Educational Technology may be defined as the application of the laws as well as recent discoveries of science and technology to the process of education."

S.K. Mitra, "Educational Technology can be conceived as a science of techniques and methods by which educational goals could be realized."

Robert A. Cox Article The Process of Educational Technology: A Tool for Development 1970). "The application of scientific process to man's learning conditions is what has come recently to be called 'educational or instructional' technology."

D.E.S. Working Party (U.K.), "Educational Technology is the development, application and evaluation of systems, techniques and aids in the field of human learning."

Robert M. Gange defined Educational Technology as "The Development of asset of systematic techniques and accompanying practical knowledge for designing, testing and operating schools as educational systems."

Educational technology is the effective use of technological tools in learning. As a concept, it concerns an array of tools, such as media, machines and networking hardware, as well as considering underlying theoretical perspectives for their effective application.(Richey 2008)

Educational technology includes numerous types of media that deliver text, audio, images, animation, and streaming video, and includes technology applications and processes such as audio or video tape, satellite TV, CD-ROM, and computer-based learning, as well as local intranet/extranet and web-based learning. Information and communication systems, whether free-standing or based on either local networks or the Internet in networked learning, underlie many e-learning processes. Tavangarian , Leypold , Nölting , Röser ,(2004)

Richey defined educational technology as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources".(Richey 2008). The Association for Educational Communications and Technology (AECT) denoted instructional technology as "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning.[(Randy Garrison and Terry Anderson2003). According to UNESCO, “ Educational technology is a communication process resulting from the application of the scientific methods to the behavioral science of teaching and learning. This

communication may or may not require the use of media such as television broadcasts, radio, cassetts etc”

1.3 Scope of Educational Technology

Educational technology refers to the use of both physical hardware and educational theoretics. It encompasses several domains, including learning theory, computer-based training, online learning, and, where mobile technologies are used, m-learning. Accordingly, there are several discrete aspects to describing the intellectual and technical development of educational technology:

- educational technology as the theory and practice of educational approaches to learning
- educational technology as technological tools and media that assist in the communication of knowledge, and its development and exchange
- educational technology for learning management systems (LMS), such as tools for student and curriculum management, and education management information systems (EMIS)
- educational technology itself as an educational subject; such courses may be called "Computer Studies" or "Information and Communication Technology (ICT)"

Hence educational technology helps to develop the teaching, learning, testing and training activities in terms of achieving 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

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.

1.5.1Hardware

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 " activites 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 technolgy 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 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). Hence instructional technology referes to the use of technological processes as a tool specifically for teaching and learning which facilitates access to information of all types. It is a broad term and Deals with the process of using technology for instruction. It Describes the technologies that facilitate access to information of all types. Its functions are Acquisition, processing, storage, and dissemination of information in all of its forms and Evaluation, management, and integration of instruction with tools available. However instructional technologist (i) Identify and analyze problems of instructional design.(ii) Devise and implement solutions to those problems.(iii) Integrate people, procedures, ideas, and devices for the purpose of providing tools which enhance the learning process.

It would seem that Instructional and Educational Technology are synonymous. The simple definition for each makes the distinction of their difference: Instructional Technology is the tool. Educational technology is the procedure for using that tool.

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

1.7 Let us Sum up

In this unit you have learnt about the concept of educational technology with its scopes and significance. You have also got an idea about hardware and software components of educational technology.To make educational universalize in our country it is really needed

that educational technology should grow properly with its quality. This unit has also distinguished educational technology from instructional technology.

1.8References

Association for Educational Communications and Technology. (2004). The meaning of educational technology. Retrieved from www.indiana.edu/-molepage/Meaning%20of%20ET_4.0pdt on May 14, 2015.

Dugger, W; & Nalik, N. (2001). Clarifying misconceptions between technology education and education technology. Retrieved from http://iteaconnect.org/TAA/Resources/TAA_Differences.html on May 14, 2015 . This article provides clarification about the purpose and direction of technology education and educational technology as well as standards ised in both educational areas.

Seels, B; & Richey, R. (1994). Retreived from www.aect.org./standard/knowlesgebase.html on May 14, 2015.
This site defines the field of instructional technology and also describes each multiple domain of the field.

Technology Education vs. Educational Technology. Retreived from http://iteaconnect.org/TAA/Resources/TAA_Differences.html on May 14, 2015.
This power Point slide helps explain the differences betwen technology education and educational technology.

Unit 2

Communication and Instruction

Unit 2

Communication and Instruction

Structure

2.0Introduction

2.1 Objectives

2.2Concept of Communication

2.3. Theory of Communication

2.4Nature of Communication

2.5Process of Communication

2.6 Components of Communication

2.7 Types of Communication

2.8 Classroom communication

2.9. Mass media approach in E.T

2.10 Designing Instructional system

2.0 Introduction

In the previous unit you got an idea about educational technology and its significance as well as its components. You 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.

1.9 Objectives

After studying the unit you will be able to

- Define communication
- Explain different types of communication
- Examine various models of communication
- Delineate the process and elements of communication.
- Suggest strategies for effective communication.
- Design instructional strategies.

2.2Concept 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. Theory of Communication

A theory of any phenomenon seeks to explain how it works. It is a set of statements and general laws relating to it. In the case of communication, we have a number of theories mainly presented as models for an easier understanding.

From the ancient Greek philosopher Aristotle to twentieth century scientists, many have proposed models of communication. Ancient India also has its own outlook about it.

There are four major assumptions relating to communication:

(i) Communication is a process which has no beginning or ending – it begins and ends arbitrarily (at random).

(ii) Communication is of the nature of a transaction with many causes and many effects on different people. Some of these are unintended.

(iii) Communication has numerous dimensions. Its sources, audiences, attitudes, tones and influences are multiple. The messages affect both the sender and the receiver.

(iv) Communication serves numerous purposes for different parties that directly or indirectly participate in it. Each party has its own interest angle.

A Survey of Theories/Models of Communication:

To begin with, Aristotle in his Rhetoric (which means the art of speaking and writing for persuasion) says that rhetoric is made up of the speaker, the speech and the audience. This forms the base of modern theoreticians.

1. Lasswell model of communication:

Lasswell, an American political scientist, seeks to describe communication by asking –

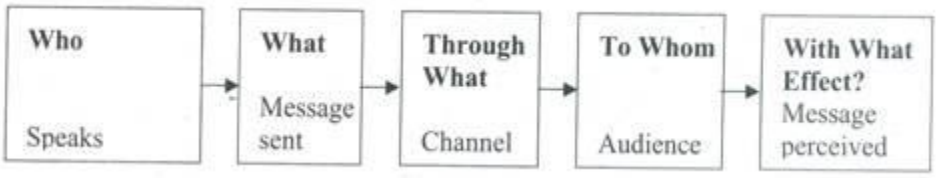
Who

Says what

In which channel

To whom

With what effect?



According to Lasswell, communication has three jobs to do:

(i) Observe the surroundings

(ii) Make meaning out of it

(iii) Transmit culture from one generation to another.

2. David Berlo's SMCR or SMCRF model:

This popular model primarily takes four elements, namely (i) Sources (ii) Messages (iii) Channels and (iv) Receivers. A fifth element was later added – feedback.

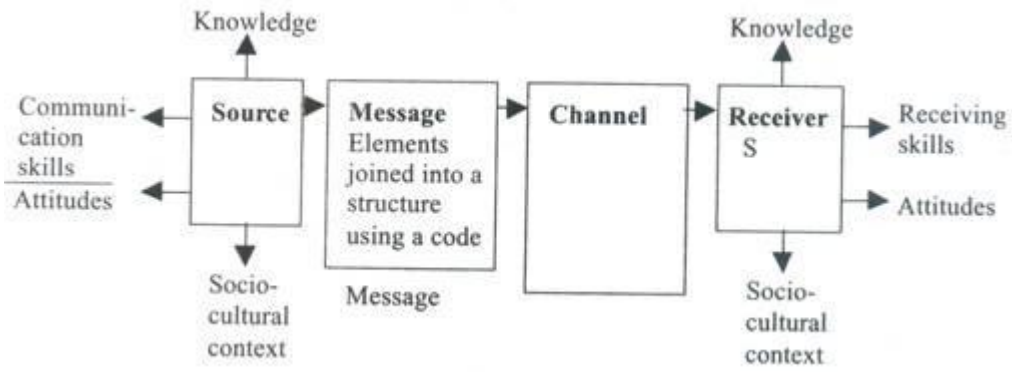
I. As for the source, we need to be aware how much the source knows, his attitude, his communicative skill and his cultural context.

II. The message is made up of words, pictures, etc. The source uses the individual elements and joins them to form his meaning.

III. The channel can be any of the senses- seeing, hearing, touching, smelling, tasting. Multiple channels can be used in communication.

IV. The receiver, too, is characterized by his/her knowledge, attitude, receiving skills and culture. In the event of a major variance between source and receiver, communication may fail.

Berlo says that communication is ongoing and dynamic. A piece of communication is a bucket with many bits from many sources – and this bucket is dumped on the receiver. This is also called his bucket theory.



3. Shannon and Weaver model:

Their theory, presented as a model, has five key components in ideal communication:

(i) An information source, creating a message

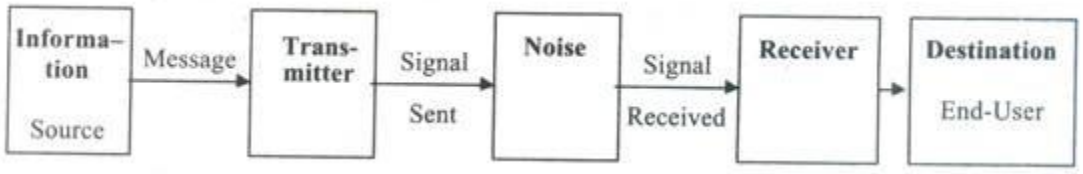
(ii) A transmitter, converting the message into a signal which can be sent

(iii) A channel, which can carry the signal to the receiver

(iv) The receiver, who reads the signal and takes it to the end-user

(v) The destination, the final user of the message

This theory adds the sixth, unintended component of noise, present in actual situations, causing interference in the reception of the message.



In this theory, noise is stated as the main problem in communication. Noise is of three types (see also "Barriers to Communication"):

(i) Technical problems (e.g. weak antenna of TV)

(ii) Semantic barriers ("wish him" taken as "poison him" under the influence of Hindi)

(iii) Problem of effectiveness (an ad jingle in a dull tune)

To this theory, Kirk and Talbot make a supplement, stating three kinds of noise (for which they use the word distortion).

(i) Stretch distortion:

In this, information is systematically changed.

(ii) Fog distortion:

In this, a message is partly lost due to surrounding interferences (e.g. air- conditioners humming)

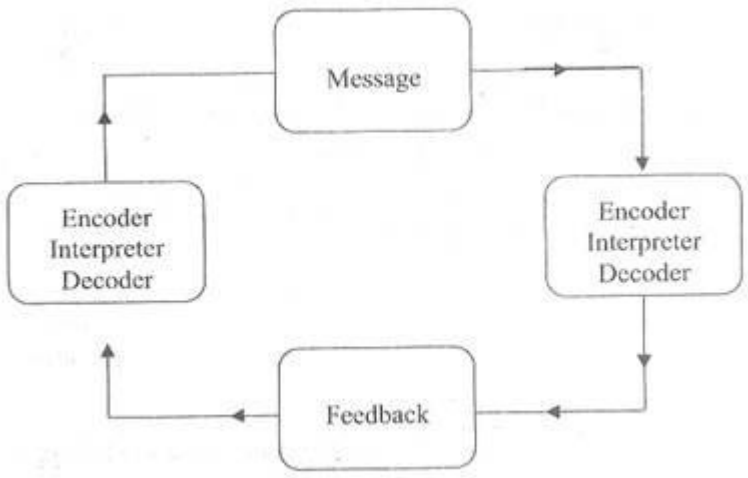
(iii) Mirage distortion:

In this, a word or a signal that is not there is received.

The Shannon and Weaver model was used in India's planning of communication. It was considered that encoding and decoding are the vital acts and need the most attention.

4. Osgood and Shramm circular model:

In their model, communication is taken as an eminently two-way process, with both parties sending and receiving by turns, interactively.



5. Carey's model – communication as a ritual:

James Carey, an American anthropologist, gave this model. A ritual is a custom, a traditional practice. This model rejects the theory that communication is a means of social control. Instead, it states that media like TV recall and re-enact myths, values and meanings of life.

Communication is seen simply as creating shared beliefs, representing the beliefs and celebrating them.

6. Paulo Freire's theory – communication as dialogue:

This model rejects Aristotle's model which sees communication as a transmission of a message. Instead, it takes communication as a means to liberation, participation in collective life and creation of awareness (of rights etc.).

7. Marxism-based model – communication as a power-relationship:

In this theory, the focus is on the fact that communication is, at times, an exercise of the power one has over others (individuals or groups). This theory asks us to consider the inequality among classes, castes, economic and social groups. Communication is a reflection of the power-relation in a family, a factory, or between senders and receivers of mass communications.

8. Indian communication theory:

Indian sage Bharat Muni has written on Indian poetics, and calls sadharanikaran the key process in communication. This term is close to the Latin word communis from which comes the word communication.

Bharat Muni says that right communication is between sahridayas (i.e. those whose hearts are attuned to each other's). To be sahridayas, the sender and receiver have to have a common culture, common learning and be adapted to each other.

Bharat Muni's rasa theory states that the human mind has nine permanent moods (sthayee bhavas) and these can be aroused to create nine rasas – i.e. types of aesthetic delight. The rasas include bhayanaka rasa (fierce mood), hasya rasa (jocular mood), Karun rasa (compassionate mood) etc.

The message, by producing the desired mood (rasa) in the audience, achieves sadharanikaran (unity of spirit).

This theory emphasizes the receiver's mental conditioning by which he/she can be in tune with the message. Sadharanikaran does not mean to persuade the other party, but stresses the joy of sharing.

In the Indian tradition, communication is a mental search for meaning whose aim is self-knowledge, freedom and reaching the Truth. While Indian model focuses on the interpretation by the receiver, Western models stress expression.

A theory of communication derived from Buddhism stresses the impermanence, the changing nature of communication in the fluid world.

9. Islamic theory – communication for building brotherhood:

According to the Islamic theory, umma or community is the main thing in communication as against Western models which deal mainly with the individual receiver. The Islamic theory considers communication as a tool of building relationships in a community. We remember the opposition in the Muslim countries to Salman Rushdie's heretic novel.

We note that Rushdie is a product of Western education and is patronized by the Western press, and his approach is seen as unpalatable to Muslim communities.

2.4 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 non verbal 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 informations between two or more persons.

2.5Process 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:

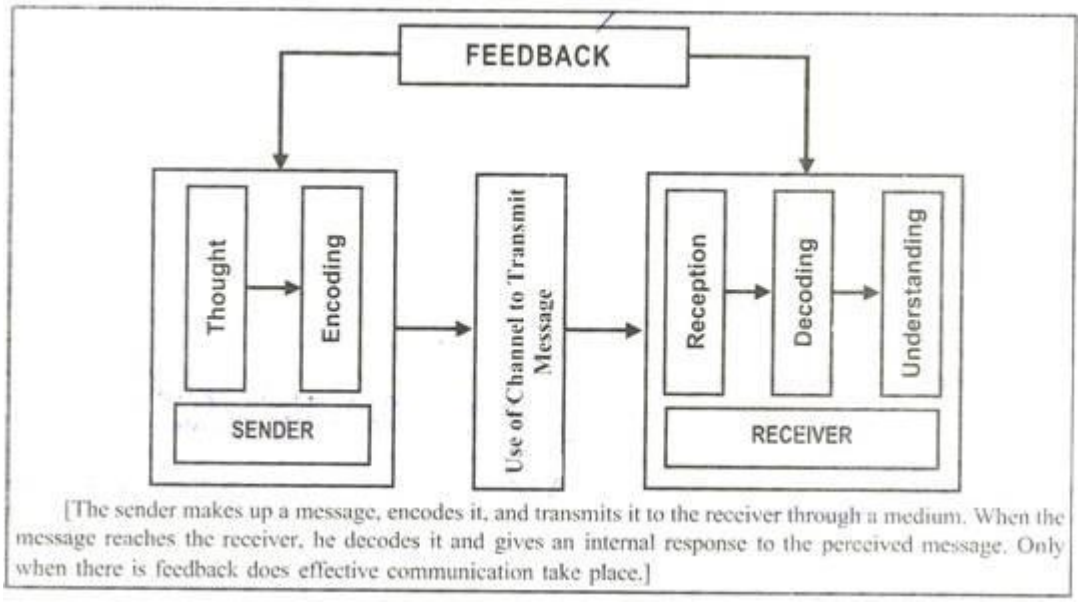
After receiving the message, the receiver has to attach some meaning to it.

(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



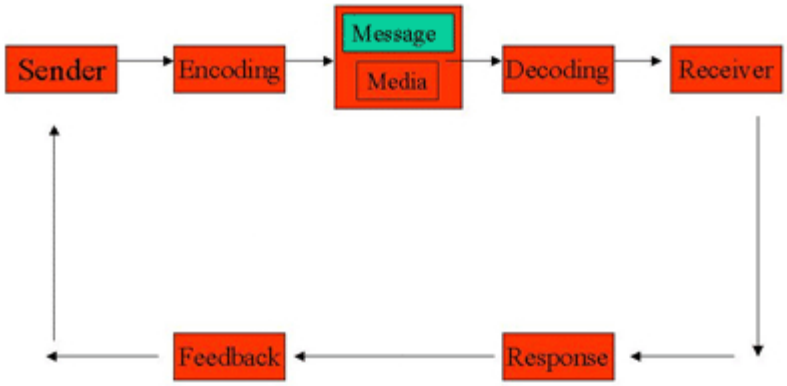
[The sender makes up a message, encodes it, and transmits it to the receiver through a medium. When the message reaches the receiver, he decodes it and gives an internal response to the perceived message. Only when there is feedback does effective communication take place.]

2.6 Components of Communication

Communication is a process of exchanging verbal and non verbal 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 non verbal 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 interpretation of message 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.



2.7 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 types namely upward communication & downward Communication.

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

2. 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, feed back 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, colours, gestures, body language or any facial expressions are known as non verbal communication. Traffic signals are one of the best examples for non verbal communication.

2.8 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 comunication has very important role in making classs room learning more interactive. Teachewr must motivate students to participate in talk, discussion, debate so that each student can express their doubts, queries, point of view without fear.

2.8.1 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 modelling 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 modelling 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 classroon sitruation more lively and vibrant for communication.

2.9. Mass media approach in E.T:

Mass media is the tool of science and tehnology that can convey loads of informan 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 individualised 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 are press, radio, motion-picture, television, etc. So mass media are many and these are technically called passive agencies of education. They influence the attitude and behaviour of the people indirectly. These agencies cover entertainment, informatory propaganda, historical record, education and improvement of moral judgement and moral tone of the people.

The role of some important mass media are discussed below:

(a) Radio:

Radio acts as the medium of mass-communication. It is used mainly to broadcast events to far and wide places of the world. It is also a very important source of entertainment. Every day, we listen various talks, discussions and debates from radio. These are extremely important and useful for the students. Especially for the purpose of teaching, many programmes are broadcast over the radio. So radio acts as a great recreational and education force. It broadcasts scientific and cultural facts. It enlightens public opinion. It stimulates curiosity and interests.

The radio has proved a valuable supplement to class teaching and learning Educational broad-casting is comparatively a new experiment and is catching on well. Through school broadcasts, expert leaching in such diverse fields of science, social studies, art, music, languages, politics, current affairs and other areas, can provide information and enrichment for pupils and for the teacher.

The educational programmes are broadcasting by the expect teachers with effective methods which demonstrate new ideas and approaches to classroom procedures. Programmes are especially designed in-collaboration with the experts for different age groups in the schools.

Following are the advantages of using radio as mass media in education:

1. Educational radio broadcasts provide "listening participation" In current history:

In radio the emphasis is on sound, rather than on picture. So many programmes especially for the purpose of teaching are broadcast over the radio and special events and (occurrences in the world are brought from the source immediately into the classroom.

As a part of classroom teaching, an educational programme may be preceded by an introduction by the class teacher and followed by long discussion among students on the subject-matter under the broadcast discussion. A talented teacher may teach through radio for the benefit of the students. So important happenings, elections, inventions, political developments in other countries and other current topics may be heard and discussed in the classroom.

2. Educational radio broadcasts are effective means of presenting music, drama and appreciation:

Radio is also a very important source of entertainment. Various talks, debates & discussions held over the radio are extremely informative and useful. For the school children, different items of the school subjects can be presented in the form of dramatised programmes.

Educational radio has excellence through dramatization, dialogue, musical features and other creative programmes which are not possible in day-to-day classroom teaching. Besides these, school concerts, folk and classical music, drama and discussion programmes of school, local and from other states are sometimes broadcast for listening in by other schools in India.

3. Educational radio broadcasts are team-teaching demonstrations:

The radio also provides opportunity for student participation in various programmes such as quiz competitions, travel talks, plays, stories, development of lessons, projects and work programmes in the form of team teaching demonstrations. This is being arranged by the combined efforts of the best resources in consultation with the specialists and some other subject experts. Subject content, curriculum validity, suitability for age groups and teaching methods are all kept in mind while accomplishing the programme.

4. Educational radio broadcasts enlist the participation of local teachers and pupils:

Well-planned radio broadcasts are presented in such a way as to engage the active participation of the local teachers and pupils. So there should be preliminary study and discussion on the topic before broadcast time. The class may be encouraged through broadcast suggestions to carry on follow-up discussion, projects or creative activities.

The teachers and the pupils both should prepare material thoroughly before presenting the programme. They should utilise all resources possible to make the programme of a very high quality and worth-listening into from the point of view of content, speech, style, audibility and presentability.

5. Educational radio broadcast helps in the long run, to make learning an open system:

Educational radio can offer corrective programmes for self learning by the individuals. It can reach the participants while at work, at play, at drawing room, at recreational centres breaking all boundaries and constraints of formal education. Being an expensive medium, it has reached villages and is now available in very comer of the society.

Since learning directly from the teacher is minimal and there is increasing stress on a system of open learning to overcome the rigidities of formal education, and there is more emphasis on learning through various mass media. Educational radio broadcasts are expected to play an important role towards a system of open learning. The non-formal approaches of educational radio can supplement the movement for de-schooling society. All the programmes lead towards a learning society where everybody can learn at any time at any place.

Radio is, at present, not only one of the popular mass media, but also a potential instructional tool in the formal, informal and non-formal education. It is now giving more emphasis on the planning and production of science programmes in both the formal and no-formal spheres of educational broadcasts.

There are also special programmes for teachers and teacher-education in most of the stations. These are intended to familiarize methods of teaching. These service has been more necessitated in recent years on account of large changes in school curriculum and methodology particularly in subjects like science, mathematics, social studies and English.

Secondary School Broadcasts aim at helping students and teachers by giving up-to-date content knowledge, providing new approaches and methods of teaching. A few non-syllabus programmes are however, broadcast in order to break away from the stereotyped formal education, for doing away with monotony in the curricular topics and also to stimulate awareness and curiosity about the modem world dealing with them ranging from popular science to current affairs.

Besides secondary schools broadcasts, primary school programmes have recently assumed greater importance. This has been done in order to reduce wastage and stagnation at the primary school stage by making the school situation more attractive and interesting.

The radio with its vast resources can organize a series of programmes in order to bring universalization of primary education and promote adult literacy. The programmes are being related to their education, health, hygiene, nutrition etc. with a thrust on bringing the audience into the mainstream of national life.

So, radio is an effective medium. It has occupied a significant place in communication. It is also playing an important role in education. It not only informs, but also inspires. It not only inculcates values and virtues, but also creates attitudes, interests and appreciation.

(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 programmes on the television especially for the school children. These programmes 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 programmes 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 skilful 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 programmes were telecast in collaboration with UNESCO.

The nature as well as impact of these programmes 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. programmes 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. Programmes could be telecast with the help of a satellite called ATS-F loaned by the National Aeronautics and Space Administration, USA.

The T.V. programmes 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 programmes.

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. programmes and these programmes 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 programmes for the children in the age group 5-8 and 9-11 years and teachers of primary schools. The ETV programmes 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 programmes 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. Programmes 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 programmes 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 skilfully. 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.

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 organised as integral part of the educational programmes. 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.

2.10 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 interservice training that will adequately train individuals to do a particular job and which can also be applied to any interservice 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)

2.11. 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 needs 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 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.

2.12Task Analysis

Task refers to work to be done in a fixed time period to achieve a goal. The term "task" is often used interchangeably with activity or process. Task analysis means breaking down of certain activity into several small steps to achieve the goal easily. Task analysis often results in a hierarchical representation of what steps it takes to perform a task for which there is a goal and for which there is some lowest-level "action" or interaction among humans and/or machines: this is known as Hierarchical Task Analysis. Tasks may be identified and defined at multiple levels of abstraction as required to support the purpose of the analysis. A **Critical** Task Analysis, for example, is an analysis of human performance requirements which, if not accomplished in accordance with system requirements, will likely have adverse effects on cost, system reliability, efficiency, effectiveness, or safety. Task analysis is often performed by human factors and ergonomics professionals.

Task analysis may be of manual tasks, such as bricklaying, and be analyzed as time and motion studies using concepts from industrial engineering. Cognitive task analysis is applied to modern work environments such as supervisory control where little physical work occurs, but the tasks are more related to situation assessment, decision making, and response planning and execution.[4]

Task analysis is also used in education. It is a model that is applied to classroom tasks to discover which curriculum components are well matched to the capabilities of students with learning disabilities and which task modification might be necessary. It discovers which tasks a person hasn't mastered, and the information processing demands of tasks that are easy or problematic. In behavior modification, it is a breakdown of a complex behavioural sequence into steps. This often serves as the basis for chaining.

The results of task analysis are often represented in task models, which clearly indicate the relations among the various tasks, An example notation used to specify task models is ConcurTaskTrees (by Fabio Paternò), which is also supported by tools that are freely available.

In the field of Education task analysis is related to the planning teaching learning phase.

I.K. Davies, in his book "The Management of Teaching", has written about the following three activities which are to befollowed by the teacher during planning teaching:1. Task Analysis2. Identification of Teaching Objectives3. Writing the Teaching Objectives in Behavioural Terms

1. Task Analysis

In task analysis, the activities related to the contents are analysed. If task analysis is not carried out properly, expectedachievement is not possible. Hence, task analysis has special importance. According to I.K. Davies, four activities areincluded in task-analysis—

(i) Description of activities which are to be learnt by the pupil.

(ii) Identification of expected behaviours.

(iii) Identification of those stimuli and conditions with the help of which pupils may show expected behaviours.

(iv) Determination of norms for expected performance or achievement Remember that through task analysis, proper decisions are made regarding learning objectives, teaching strategies and tactics.

Task analysis is of the following three types:

(i) Content Analysis or Topic Analysis

(ii) Job Analysis

(iii) Skill Analysis

(i) Content Analysis or Topic Analysis: In content analysis, the content or topic is analyzed on educational and intellectual basis. In the words of I.K. Davies, "It is the analysis of topic or content unit to be taught into its constituents or elements and synthesize into logical consequence."Since many techniques are used for content analysis but matrix techniques of I.K. Davies is considered most useful. According to this technique, content is divided into sub-topics first of all which are meaningful and completely separate from each other. Then, these sub-topics are psychologically arranged in a sequence. Then, each sub-topic is divided into its elements and arranged in a sequence. It is important that each element of the sub-topic is meaningful, complete and separate from each other like sub-topics of the content are arranged in a sequence on the basis of certain laws and maxims of teaching. Such as i) From simple to complex(ii) From known to unknown(iii) From concrete to abstract(iv) From whole to part(v) From Psychological to Logical.

Hence, in content analysis, both activities of analysis and synthesis are included. We can represent the content analysis in the through I.K. Davies matrix technique.

Teacher should follow the following sources to present the content or topic by analysis:

(i) Study of Standard Text-Book

(ii) Knowledge of Student's Needs

(iii) Understanding Educational Needs

(iv) Utility of Teaching Aids

(v) Possibilities of Examination System

(ii) Job Analysis: This step is concerned with 'what is to be done in the task.' Hence, in this phase, physical and psychomotor activities are determined and sub-processes are analyzed.

(iii) Skill Analysis: The skill analysis is the next stage of job analysis. In this step, it is emphasized how the work isaccomplished. It includes all those tasks which need skill, but the skill analysis is done only for questioning and diagnosis activities

Content analysis:

2.13 Designing of Instructional strategies-lecture, team teaching, discussion, seminar and tutorial

2.13.1 Lecture Strategy

The word *lecture* comes from the Latin word *lectus*, from the 14th century, which translates roughly into "to read." The term *lecture,* then, in Latin, means "that which is read." It wasn't until the 16th century that the word was used to describe oral instruction given by a teacher in front of an audience of learners.

In lecture method a teacher tries to present a segment or unit of the desired content material of a subject to a group of learners through lecturing (verbal communication of ideas). It aims to attain the specific teaching-learning objectives related particularly to the cognitive and affective domains of the learner's behaviors. The lecture method, as an oldest traditional mode of teaching, may prove quite advantageous in so many ways for the present day classroom teaching-learning. The main criticism labelled against the use of it lies in its focusing understanding and reflective levels.

Today, lecturing is a teaching method that involves, primarily, an oral presentation given by an instructor to a body of students. Many lectures are accompanied by some sort of visual aid, such as a slideshow, a word document, an image, or a film. Some teachers may even use a whiteboard or a chalkboard to emphasize important points in their lecture, but a lecture doesn't require any of these things in order to qualify as a lecture. As long as there is an authoritative figure (in any given context) at the front of a room, delivering a speech to a crowd of listeners, this is a lecture.

Advantages

- Gives the instructor the chance to expose students to unpublished or not readily available material.
- Allows the instructor to precisely determine the aims, content, organization, pace and direction of a presentation. In contrast, more student-centered methods, e.g., discussions or laboratories, require the instructor to deal with unanticipated student ideas, questions and comments.
- Can be used to arouse interest in a subject.
- Can complement and clarify text material.

- Complements certain individual learning preferences. Some students depend upon the structure provided by highly teacher-centered methods.
- Facilitates large-class communication.

Disadvantages

- Places students in a passive rather than an active role, which hinders learning.
- Encourages one-way communication; therefore, the lecturer must make a conscious effort to become aware of student problems and student understanding of content without verbal feedback.
- Requires a considerable amount of unguided student time outside of the classroom to enable understanding and long-term retention of content. In contrast, interactive methods (discussion, problem-solving sessions) allow the instructor to influence students when they are actively working with the material.
- Requires the instructor to have or to learn effective writing and speaking skills.

2.13.2 Team Teaching Strategy

Team teaching involves a group of instructors working purposefully, regularly, and cooperatively to help a group of students of any age learn. Teachers together set goals for a course, design a syllabus, prepare individual lesson plans, teach students, and evaluate the results. They share insights, argue with one another, and perhaps even challenge students to decide which approach is better

Team teaching as an innovation in the field of teaching and learning, aiming to improve its process and products by calling upon the joint cooperative efforts of a team of the personnel (teachers and others) by utilizing the resources available in a given teaching-learning situation, at the proper time and in a proper way.

Teams can be single-discipline, interdisciplinary, or school-within-a-school teams that meet with a common set of students over an extended period of time. New teachers may be paired with veteran teachers. Innovations are encouraged, and modifications in class size, location, and time

are permitted. Different personalities, voices, values, and approaches spark interest, keep attention, and prevent boredom.The team-teaching approach allows for more interaction between teachers and students

In team teaching a group of teachers, working together, plan, conduct, and evaluate the learning activities for the same group of students. In practice, team teaching has many different formats but in general it is a means of organising staff into groups to enhance teaching. Teams generally comprise staff members who may represent different areas of subject expertise but who share the same group of students and a common planning period to prepare for the teaching. To facilitate this process a common teaching space is desirable.

Team teaching requires proper

- planning with regards to staffs, their abilities, specialization
- Goal setting
- Deciding the target group, time frame
- Conducting meeting, responsibility allocation
- Deciding strategy, media, method
- Implementation of plan and media strategy
- Resource Management
- Evaluation
- Feedback and Continuity of Programme with Modification

Advantages

Team teaching is an approach which involves true team work between two qualified instructors who, together, make presentations to an audience. The instructional advantages of team teaching include:

(1) Lecture-style instruction is eliminated in favour of a dynamic interplay of two minds and personalities.
(2) Teaching staff act as a role models for discussion and disagreement.
(3) Team teaching makes effective use of existing human resources.

(4) Team teaching has the potential for revitalizing instructional capabilities through a process of dialogue.

(5) Interest in traditional courses can be stimulated as students share the enthusiasm and intellectual discourse that the lecturers Communicate.

(6) The effective use of facilities is possible.

(7) Team teaching provides opportunities for interaction with the audience.

Disadvantages

- Team teaching is not always successful. Some teachers are rigid personality types or may be wedded to a single method.
- Some simply dislike the other teachers on the team. Some do not want to risk humiliation and discouragement at possible failures.
- Some fear they will be expected to do more work for the same salary. Others are unwilling to share the spotlight or their pet ideas or to lose total control.
- Team teaching makes more demands on time and energy. Members must arrange mutually agreeable times for planning and evaluation.
- Discussions can be draining and group decisions take longer.
- Rethinking the courses to accommodate the team-teaching method is often inconvenient.
- Opposition may also come from students, parents, and administrators who may resist change of any sort. Some students flourish in a highly structured environment that favors repetition. Some are confused by conflicting opinions.
- Too much variety may hinder habit formation.
- Salaries may have to reflect the additional responsibilities undertaken by team members. Team leaders may need some form of bonus. Such costs could be met by enlarging some class sizes. Nonprofessional staff members could take over some responsibilities.
- Personal concerns usually expressed about team teaching include:

  - not all team members will contribute equally;
  - teachers do not understand how to make the team work;
  - there will be personality conflicts to deal with in addition to the teaching itself;
  - a preference for working alone;

- all the work will fall on the team leader/senior subject expert;
- it will be too difficult to cover all the course content;
- team meetings will be a waste of time.

2.13.3 Discussion Strategy

The discussion strategy involves some sort of discussion, i.e. exchange of ideas between students and teachers or among a group of students resulting in some learning for the realization of the predetermined teaching learning objectives. It may prove quite helpful in a number of teaching-learning situations if handled properly in an able leadership.

Discussion means to engage in an orderly verbal interchange and to express thoughts on a particular subject This is the Discussion Method, also called the Socratic Method after the Ancient Greek philosopher Socrates, who would engage his students with questions and dialogue. Because the class is small, the tutor is able to determine each student's progress, and students have ample occasion to make their difficulties known. There is a true meeting of the minds.

The Discussion Method demands that students come to class well prepared. Compelling them to think out their arguments in advance and to answer their peers' questions and counter-arguments, it sharpens their powers of reason, analysis, and articulation. It thus provides them with fundamental skills necessary for success in any discipline or profession.

Discussion methods are a variety of forums for open-ended, collaborative exchange of ideas among a teacher and students or among students for the purpose of furthering students thinking, learning, problem solving, understanding, or literary appreciation. Participants present multiple points of view, respond to the ideas of others, and reflect on their own ideas in an effort to build their knowledge, understanding, or interpretation of the matter at hand. Discussions may occur among members of a dyad, small group, or whole class and be teacher-led or student-led. They frequently involve discussion of a written text, though discussion can also focus on a problem, issue, or topic that has its basis in a "text" in the larger sense of the term (e.g., a discipline, the media, a societal norm). Other terms for discussions used for pedagogical purposes are

instructional conversations (Tharp & Gallimore, 1988) and substantive conversations (Newmann, 1990).

A defining feature of discussion is that students have considerable agency in the construction of knowledge, understanding, or interpretation. In other words, they have considerable "interpretive authority" for evaluating the plausibility or validity of participants responses. To illustrate, the following excerpt is taken from a discussion between a teacher and a small-group of second-grade students (from Eeds & Wells, 1989). They are discussing the short story, "Me and Neesie," by Eloise Greenfield. The story is about a girl, Janell, and her imaginary friend, Neesie, and the teacher and students are trying to understand why Neesie is at school with Janell for the day.

Advantages:

- emphsis on learning instead of teaching.
- participation by everyone in the class.
- development of democratic way of thinking.
- training in reflective thinking.
- traning in self-expression.
- spirit of tolerance is inculcated.
- learning is made interesting.

Disadvantages:

- Discussion method is not appropriate for all the topics.
- It can be used only to students who have some basic knowledge in the topic.
- some of the students may feel shy or reluctant to take part while others may try to dominate
- Teacher may lose control over the students and they may end up in quarelling.

2.13.4 Seminar Strategy

Seminar is an instructional strategy which involves paper reading followed by group discussion to clarify the complex aspects of theme. Seminar generates a situation for a group to have guided

interaction among themselves on a theme which is generally presented to group by one or more members. Participants who present the theme should study the theme thoroughly to make selection of relevant material. Collected material is presented in the form of paper. It is circulated among the participants in advance. It provides the structure of theme, to facilities its communication.

A seminar is an advanced group technique which is usually used in higher education. It is an instructional technique it involves generating a situation for a group to have a guided interaction among themselves on a theme. It refers to a structured group discussion what
usually follows a formal lecture or lectures often in the form of an essay or a paper presentation on a theme.

Principles

Seminar is a form of a class organization that utilizes a scientific approach for the analysis of a problem chosen for discussion. It is a discussion method of teaching where an informal group of 10-15 (not more than 25) learners participate to solve problems in a scientific approach and analysis. It is an organized, guided discussion with a focus on the discovery of new relationship by the participating individuals. • It differs from intellectual initiative. The student plays an active role in seminar. The objective of the seminar is to give students opportunity to participate in methods of scientific analysis and research procedures. Students are expected to do considerable library search prior to the seminar.

A seminar group is mainly concerned with academic matters rather than individual students and commonly involves the reading of an essay or paper by one group member followed by a discussion by the totoal group on the topic. The role of a teacher is to help students to select, formulate and resolve the most significant problems and suggest the available sources of information. As the seminar progresses, the students assume greater responsibility for addressing the problems and conducting discussion.

Features of Seminar

• Teacher is the leader.

• The group generally consists of 10 to 15 participants

. • An ideal seminar lasts for 1-2 hrs. The topic is initially presented by the presenter followed by group discussion.

• The leader should keep the discussion within limits so the focus of discussion can be mentioned.

• Care should be taken to avoid stereotypes.

• In student seminars, students present their data in an informal way under the leadership of the teacher, followed by a teacher monitored discussion.

• All members take part in discussion in an informal but orderly manner.

• The chairman should be skilled in encouraging the timid participants. • A student secretary may record the problems that come up and the solutions given to them.

Organizing a seminar

• Define the purpose of the seminar.

• Relate the topic of seminar and discussion to the main concept or the objectives to be attained.

• Direct and focus on the discussion topic.

• Help students to express their ideas and keep the discussion at a high level of interest so that the students listen attentively to those who contribute the ideaas.

• Plan comments and questions that relate to the subject and also guide and direct the discussion.
• Set time limitations for each person's contribution.

• Guard against monopoly of the discussion by any member of the seminar. • Plan for summary at intervals during the discussion and also at the end of the discussion and relate the ideas expressed to the purpose of discussion.

• Have the discussion recorded by a student as a recording secretary or by tape recording. • Plan for teacher and student self evaluation of the progress made towards the immediate objectives.

Role of A Teacher

• Select the topic.(Give reasonable time for preparation).

• Remain in the background in the seminar, but sit where the whole group can be seen.

• Prepare to help out in the initial stages of using this method in case of long silence.

• Be sure that essential points are not overlooked and that gross inadequacies are corrected (preferably by the other members of the class).

• Make sure that all members have a share in the discussion and that irrelevant discussion is avoided.

Advantages

• Student plays an active role; it pre supposes that the student has backgroung knowledge.

• A properly conducted seminar has potentials to teach students the method of scientific analysis and technique or research.

• Individual student and the group as a whole try to solve the problem. • Exchange of facts and efforts to crystallize group opinion is a clear advantage in seminar method.

• The problem solving skills of the students are sharpned by participation. • The students develop vocabulary, articulation, problem solving and critical thinking skills as they participate in the seminar.

• A seminar helps in self learning and promotes independent thinking. • Ability to see own problems is increased because of personal difficulties can be compared with those of the group.

• Skillfully directed seminar promotes group spirit and co- operativeness.

Disadvantages

• Seminar is a time consuming process.

• It cannot be applied to new students.

• Timid students may initially feel nervous.

• If subject knowledge is poor, unnecessary discussions arise.

• The approach to problem solving extends to student's professional and personal activities.

2.13.5 Tutorial Method

The tutorial method help in supplementing or enriching the traditional classroom instruction by calling up on a tutor to provide his personalized and individualized services to a student or a small group of students- tutees for their required betterment.

A tutorial is either a one-on-one session between a teacher and a student, or a very small group (three or four) of students and an instructor, where the learners are at least as active in discussion and presentation of ideas as the teacher. It is the follow up study of lecture. It is highly Individualized remedial teaching. It is based on principles of individual difference and remedial teaching. It involves steps such as

- Diagnosis
- Prescription
- Follow up

To remove this drawback of group-teaching, pupils are divided into small groups so that the personal problems which came across during group teaching may be solved successfully. Hence, a tutorial is a sub-part of the class in which a teacher tries to solve the problems of the small groups of the pupils through individual teaching. Tutorials are of three types :

1. Group Tutorial

2. Supervised Tutorial

3. Practical Tutorial.

1. Group Tutorial: Group Tutorials are conducted to solve the problems of the grown up pupils of average level. It should be remembered that the group tutorials can only be organized

successfully by a teacher who possesses the full knowledge of Group Dynamics and Social Psychology.

2. Supervised Tutorial: In the supervised tutorials, the talented pupils and the teachers discuss the problems time to time. The pupils put up their difficulties. Then the teacher tries to solve those problems. In this way, after a discussion between a teacher and the pupils, the solutions to some problems come up.

3. Practical Tutorial: Practical tutorials are conducted to develop the physical skill and to achieve the objectives of psychomotor skill. Pupils have to work in the laboratory for this. Such tutorials are more useful for younger and pupils of lower-classes. Some people consider the teacher as primary and pupils as secondary in conducting the tutorials. In such a situation, if a tutorial acquires the form of a lecture, then this will be considered as autocratic strategy. Contrary to this, if the pupils are more active instead of the teacher, then it will definitely occupy its main place in democratic strategies. Prof. Bloom's view is that the discussion should be based on the problem and the teacher should help the pupil to the maximum to solve the problem

2.13 Let us Sum up

In this unit you were introduced with the concept of communication with its theory, models, process, elements and importance. You have also explored different types of communication including verbal and non verbal.. You found the way you should adopt for communicating in classroom situation. To make education global it is important to use mass media communication. You have also got an idea about how to design instruction with instructional objectives, task analysis and instructional strategies such as lecture, team teaching, tutorial teaching and seminar. You also got a detail idea about how effective strategies can be planned with effective communication. We expect that you will follow the theory of effective communication in your day to day classroom operation.

2.14References

Read more: Team Teaching - Advantages, Disadvantages - Teachers, Students, Teacher, and Learning - StateUniversity.com http://education.stateuniversity.com/pages/2493/Team-Teaching.html#ixzz3awpEy8NXi

http://www.yourarticlelibrary.com/business/business-communication-nature-importance-process-and-other-details/27514/

. - See more at: http://www.classroom-management-success.org/teacher-student-communication.html#sthash.KrJmfCTm.dpuf

I.

Unit III

Teaching Levels, Strategies and Models

UNIT-III -Teaching Levels, Strategies and Models

Structure

3.0 Introduction

In the last unit we have discussed about the communication process and how teacher can use it for effective instruction. However for proper learning on the part of learner it is essential to have effective teaching. Teaching is not an easier task. To understand the teaching process it is important to comprehend several levels, strategies and models of teaching. These attributes of teaching are the basic criteria for designing tools of educational technology. So that as an educational technologist you can be able to develop software basing on these theories and strategies for effective learning

3.1 Objectives

After studying this unit you will be able to

- Define teaching level and teaching strategy
- Explain teaching level

- Classify teaching models
- Apply technique to modify behavior of teachers.

3.2 Teaching Levels

Teaching is a purposeful process which has close relationship with learning. Therefore, in the modern age, teaching-learning are accepted as one concept. Remember that the content has its own nature by which various learning levels can be effected with the acquisition of various teaching objectives. It is to be observed that a teacher can present the content at three levels, from thoughtless to thoughtful situations. These levels are—

1. Memory level

2.Understanding level,

3. Reflective level.

It depends upon the teacher's competency that to what extent he succeeds in reaching upto reflective level starting from memory level on the basis of his efficiency and experiences. It is a common observation that the normal teaching corresponds to the memory level teaching. Such learned and efficient teachers who succeed in upgrading their teaching from memory level to reflective level-teaching are lacking

3.21 Memory Level

Memory is a mental process which occurs essentially in some quantity in every living being. Actually, when a person sees some object, thing or place, then the image of the object, thing or a place are formed in his mind. To memorize these pre-learnt things is called memory. We recall these accumulated past experiences when required and were cognize them by bringing them into our conscious mind, then that is called memory. Ideas of following scholars make clear the meaning of memory: Woodworth—"Memory is the direct use of what is learned."J.S. Ross—"A memory is a new experience determined by the dispositions laid down by a previous experience, the relation between the two being clearly apprehended."Mcdougall—"Memory implies imagining of events as experienced in the past and recognizing them to one's own past

experience."Stout—"Memory is the ideal revival in which the objects of past experience reinstate as far as possible in the order and manner of the original occurrence.

The following are the phases of memory:

(i) Learning. Memory depends upon the experiences. Hence, the first phase of memory is the learning of some facts. Learning task is done by the conscious mind. In this phase, the life-experiences get stays in the brain in the form of mental impressions and these can be made conscious as and when needed. Hence, the pupils should acquire direct knowledge. Repeat it again and again. They should search out the meaning of that knowledge. Memorize that knowledge by linking it with other objects or subjects.

(ii) Retention. To make the contents permanent in the minds is called retention. Remember that the retention power occurs differently in the different individuals. A memory is said to be good if a person can retain something in his mind for a longer duration. The pupils and adolescents have more retention power as compared to the adults. It is for this reason that they memorize rapidly. In the opinion of psychologists, the retention power reaches at its peak at the age of 25 years and after this it starts reducing. Remember that the retention power depends mainly upon four conditions, which are—(i)brain, (ii) health, (iii) interest, and (iv) thinking

Every experience learns impressions in the brain. Our brain not only protects these impressions, but also arranges them ina sequence. Retention power is also closely related to the structure of the brain. Due to the differences in the structure of the brain of every person, variations in the retention power occur. Physical health is also deeply related to the retention power. Our nervous tissues function very conveniently when we have sound health. Consequently, we learn anything very easily. It is the reason that in the morning, i.e. with complete sound health, when we learn something, it gets memorized very rapidly. It is the only reason that our nervous tissues don'twork properly when we have ill-health. Hence, our retention power lowers down. Retention power is also related to the interest and thinking. We remember rapidly in which we have interest. Due to our interest, we think about that thing again and again and we establish relationship with other things resulting in our rapid learning.

(iii) Recall. The learnt experiences when brought to conscious mind is called recall. Recalling of past experiences is responsible for a person's good or bad memory. If he fails to recall when needed all goes in vain even in spite of his superb learning. When a person fails to recall the retained material, that enhances the chances of forgetting. Psychologists have emphasized on certain laws in order to bring learnt material at the conscious level. These laws are Law of Contiguity, Law of Similarity, Law of Contrast, Law of Continuity of Interest, Law of Primacy, Law of Regency, Law of Frequency, Law of Vividness.(iv) Recognition. If we see an object or a person and we can say that we have seen before that object or a person is termed as recognition. In other words, recognition is that mental process by which we can tell, by coming in contact with an object or a person what a thing is, who is the person and when we were introduced? Remember that the recall and recognition have the similar relationship as that of brain and the body. Recalling becomes difficult when the association among objects does not occur and consequently we are unable to remember them. Contrary to this, we recognize them quickly when our association among those objects and persons becomes strong.

Characteristics of good memory are as follows:

(i) Rapidity in Learning. The first characteristic of good characteristic is its rapidity and simplicity in learning. Hence, the memory of those pupils can be said as good who learn rapidly.

(ii) Stability of Retention. Another characteristic of good memory is retention of learnt material for a longer duration. The pupils are said to have a good memory if they retain for a longer time what they have learnt.

(iii) Rapidity in Recall. In addition to rapid learning and stability of retention, the third characteristic of good memory is rapidity in recall. Those pupils are said to have good memory who can bring anything to their conscious level very rapidly. Only those pupils are said to have good memory who can recall anything according to the needs and at proper time.

(iv Serviceableness. The fourth characteristic of good memory is its score ability at some occasion. There are some pupils who possess much but when needed, they remember only irrelevant material. Contrary to this, there is no dearth of the pupils who bring only desirable at the conscious level. Only those pupils are said to have good memory who can recall the appropriate material according to the need.

(v) Forgetting Irrelevant Things. A good memory requires forgetting of irrelevant things. The recalling of irrelevant things at the time of examination does not benefit the pupils. Similarly, recalling the painful events of life struggle does not prove advantageous in any way

Persons differ in ability to memorize. Some persons don't forget after a single reading. Contrary to this, people forget frequently even after repeated learning. On the basis of their different abilities memory can be classified as follows:

1. Immediate Memory. Immediate memory is that when a person recall immediately after learning something. This type of memory has the following two characteristics—

(a) It is temporary. It is possible that the learnt material may not retain for a longer period,

(b) Its development occurs along with age. In an infancy period, the development of the pupil is slow and somewhat faster during childhood. During adolescence, this rate of development acquires its maximum limits.

2. Personal Memory. While recalling past experiences, we remember our personal past experiences.

3. Permanent Memory. The recalling of learnt material for a longer time is known as permanent memory. In other words ,the things with which our association is strong, are remembered for a longer duration.

4. Logical Memory. To learn something by using intellect and its recalling when needed is called logical memory. Burgson has termed this memory as true memory.

5. Rote Memory. Rote memory is that memory in which the facts are crammed without any understanding. Such type of memory is very sharp during childhood. It is the reason that counting and tables etc. are crammed very rapidly. However ,the memory is not considered as very good memory

.6. Mechanical Memory. Mechanical memory is also known as physical memory. When our body becomes habitual of doing any task repeatedly, then our body has no need to recall that task again and again. For example, a swimmer swims without any major recalling.

7. Active Memory. The recalling of past experiences needs some efforts, for example the candidates sitting in examination hall have to make efforts to recall the answer to the questions again and again

8. Passive Memory. In passive memory, we recall the past experiences without any effort

.9. Impressional Memory. The recalling of the material learnt from the books and companions is called impersonal memory. There is no place of personal experiences in such types of memories

In reality, there is a definite pattern of memory level teaching. In this type of teaching, the teacher is like a dictator who suppresses the independence, interests, attitudes and competencies of the pupils and tries to impose the facts and information upon the pupils. Hence, in this level of teaching, the teacher remains active but the pupils go on learning by heart in strict discipline as a passive listener. In short, no inter-action occur between the teacher and the pupils. In the memory level teaching, signal learning, chain learning and stimulus-response learning are emphasized. In the end, both essay type and objective type examinations are used to evaluate the learnt contents. The above description shows that the memory level teaching is teacher-centered. Pupils have secondary place in this level of teaching. As a result, the teacher goes on imposing facts and information externally by keeping them in the strict discipline in order to develop the pupils mentally, neglecting their interest, attitudes, abilities and needs. This makes the pupils as crammers but they can not be an intelligent learned person. The teaching of this level has the maximum level of motivation. The evaluation of the acquired knowledge is done by traditional methods. In spite of many drawbacks, the memory level of teaching has some special importance. Its reason is that the teaching at understanding and reflective levels can be successful only when the teaching at memory level occurs. In other words, understanding and reflective level teaching cannot take place unless and until memory level teaching has not been managed

Model of Memory Level of Teaching

Herbart is considered exponent of memory-level teaching. He has described the following steps while presenting the model of memory level teaching:

(a) Focus: According to Herbart, the focus of memory level teaching is the emphasis on cramming of facts and development of the following capacities—

(i) Training of mental aspects.

(ii) Providing knowledge of facts.

(iii) Retaining the learnt facts.

(iv) Recalling and re-presenting the learnt facts.

(b) Syntax: Herbart has divided the memory level-teaching into five steps which are known as Herbart's Five Formula Steps. By following these five steps, the teacher can create learning situations for memory-level teaching. The following is the sequence of Herbart's five steps—

(i) (a) Preparation,

(b) Statement of Aim

.(ii) Presentation

(iii) Comparison of Association.

(iv) Generalizations.

(v) Application.

(i) (a) Preparation. Preparation is the first step of teaching method. In this step, some questions are asked to test the previous knowledge of pupils so that the curiosity to learn new knowledge may be aroused in them. In other words, in this step, the pupils are prepared to acquire new knowledge by testing their previous knowledge.

(b) Statement of Aim. This step is the part of the first step. Here the topic becomes clearer to the pupils and the teacher himself writes the topic on the black-board.

(ii) Presentation. In this step, the lesson is developed with the help of the pupils. In other words, by stimulating their mental activity, the pupils are provided with opportunities for

self-learning. The teacher tries to derive most of the information from the pupils so that a relationship may be established between the new and the previous knowledge.

(iii) Comparison and Association. Herbart has named this step as association. Here, the mutual relationship is established among facts, events and experiments by comparisons which clarifies the learning material in the minds of the pupils. Hence, the teacher should establish a relationship between two subjects and between the facts and events of one subject and other facts and events of the same subject and make their comparison so that the new knowledge may be clarified and made permanent in the minds of the pupils.

(iv) Generalization. Herbart named this step as a system. After explaining the basic lesson, the pupils are given the opportunities to think in this lesson. After this, they formulate some such principles and laws which can be used in the future life situations.

(v) Application. It is the last step of teaching. In this step it is observed whether the new learnt knowledge can be used in new situations or not. This can be verified by the principle through questioning or he can provide new opportunities to make use of learnt knowledge. This makes the knowledge permanent and the laws can be verified.(c) Social System: The process of teaching is social and professional. The members of this social system are—

(i) pupil, and

(ii) the teacher.

At this level, the behavior of the teacher is dominating based upon the dictatorial and authoritarian tendencies. As a result of this, the pupil functions as a passive listener. Hence, the function of the teacher is—

(i) presenting the contents,

(ii) controlling the pupils' activities, and

(iii) providing motivation to them. All the activities are performed by the teacher and the pupils follow considering them ideal.(d) Support System: In the examination system of memory-level teaching, cramming is stressed. Hence, while evaluating the teaching of this level, both oral and written examinations are used. Remember that while the teaching of this

level is evaluated, essay type examination is considered more useful, but the steps like recall and recognition are also used successfully through the objective type examination.

Guidelines

Memory level teaching provides help to the teaching at understanding and reflective levels on one side while it provides sis for the success of these two. Hence, the following suggestions are being given to make the memory-level teaching effective—

(i) The teacher should try to achieve the cognitive objective

.(ii) The content to be presented should be purposeful.

(iii) The teaching points should be presented as a whole or in toto.

(iv) The content should be presented in a sequence

v) There should be no teaching when the pupils are tired.

(vi) Only whole-method should be used.

(vii) A definite reinforcement system should be used

.(viii) Recall should be grown through practice.

(ix) Recapitulation should be done in a rhythm.

3.22 Understanding Level

Remember that in the understanding level of teaching, the teacher tries to present his instructions and stresses to make understand to the pupils the generalizations, principles and facts. It results in turning the teaching thoughtful. In other words, in understanding-level teaching, the teacher tries to provide more and more opportunities to develop the intellectual behaviors of the pupils. This develops the essential competencies for generalizations, insight and solving the problems. In this way, both pupils and teachers participate in developing the lesson while teaching occurs at the understanding level.

Models

The model of understanding-level teaching was indoctrinated by Morrison. Hence, it is named as Morrison's Teaching Model. Morrison has described the structure of this model in the following four steps—

(a) Focus. According to Morrison, the focus or objective of the understanding-level teaching model is that the pupil should achieve the mastery of the concept. In other words, the teacher stresses upon the mastery of the content so that a desirable change may occur in he personality of the pupils.

(b) Syntax. Morrison has divided the syntax of understanding-level teaching in to five steps and a teacher can create teaching and learning situations following them. The order of five steps of this model is as follows—

(i) Exploration: Morrison has included the following activities under this step—

(a) Previous knowledge testing by questioning.

(b) Analysing the contents, the elements are arranged in a logical sequence from psychological point of view.

(c) Determining how the units of contents or new knowledge should be presented.

(ii) Presentation: At this stage, the teacher remains more active. He performs the following activities for the presentation of the contents—

(a) The teacher presents the content in small units. Also, he tries to maintain the sequence of these units and a relationship with the pupils establishes.

(b) While presenting the contents, the teacher also diagnoses whether the contents have been understood by the pupils or not. If not, how many pupils could not acquire this understanding.

(c) The teacher recapitulates the contents till most of the pupils acquire the understanding.

(iii) Assimilation: After presenting the contents, the teacher reaches at the conclusion that most of the pupils have gained the new knowledge, he provides pupils opportunities for assimilation. It has the following characteristics—

(a) The pupils are provided with occasions for generalization through assimilation so that they get the mastery of the concept.

(b) Assimilation-opportunities are provided in order to stress upon the depth of the content.

(c) At the time of assimilation, every pupil studies in accordance with his requirement. Hence, the teacher should provide maximum opportunities of performing individual activities.

(d) In assimilation, the pupils work themselves in laboratories and libraries. Hence, home assignments are also given

.(e) In the assimilation period, supervised study occurs. During this period, both pupils and the teachersremain active. The pupils perform individual activities and the teachers guide them according to the need during supervision.

(f) During the assimilation period, the teacher tests whether the pupils have achieved mastery over the contents or not. If this does not happen, the teacher should provide re-opportunities for assimilation after observing precautions during supervision.

(iv) Organization: The period of assimilation is of mastery test. After succeeding in the mastery test, the pupils enter the period of organization or recitation according to the nature of contents. According to Morrison, during organization, the pupils are provided with the occasions for re-presentation. All the pupils write contents in their own language. From this, the teacher comes to the conclusion whether the pupils can write the contents without anybody's help or not. Hence, the pupils enter into recitation rather to the organization.

(v) Recitation: Recitation is the last step of understanding level teaching. During this period, the pupils present the contents orally before the teacher and his mates

.(c) Social System. In the understanding level of teaching, the various steps of social system go on changing. In presentation, the teacher controls the behavior of the pupils like memory-level by keeping himself more active and heal so provides necessary motivation. In assimilation-period, both pupils and the teacher remain active. The teacher imparts necessary instructions to the pupils they work themselves with full involvement.

(d) Support System. In understanding-level teaching, the support system does not remain static, but it goes on changing.The pupils have to pass the examination of presentation in order to perform experiment in assimilation. Similarly, theyhave to pass assimilation test essentially for their entry into organization and recitation. At the end of organization period,a written test takes place. Similarly, recitation is followed by an oral test. Hence, both oral and written tests (essay typeand objective type) occur during the various steps of understanding-level of teaching.

Features.

The following are the limitations and characteristics of understanding-level model given by Morrison—

(i) The main problem of this teaching system is its stress upon the mastery of the content. Human behaviour is over-looked.

(ii) Morrison has considered teacher's involvement in the content as motivation for the pupils, while psychological motivation can prove more effective.

(iii) Mastery of the contents restricts the development to the cognitive aspect only and it does not help in developing affective and psychomotor aspects.

(iv) Psychologically, this model of teaching given by Morrison is considered more effective.

(v) With the teaching model, a deep study of the contents can be carried out by the pupils. Hence, this model causes complete learning.

Guidelines

Morrison has provided the following suggestions to make the understanding level of teaching more effective:

(i) The pupils should be allowed to enter the understanding level of teaching unless and until they pass out the tests of memory-level teaching.

(ii) Every step of understanding level of teaching should be followed in a proper sequence

.(iii) The pupils should be promoted to the new step unless they pass the tests of previous stage. For example, pupils should be allowed to enter assimilation when they pass the tests of presentation.

(iv) The teacher should provide psychological motivation from time to time in spite of his involvement in the content. Also he should raise the aspiration level of the pupils.

(v) The teacher should make efforts for solving the problems related to understanding level of teaching.

3.23 Reflective levels of teaching

Remember that the reflective-level teaching means 'problem centered' teaching. In this, the class-room environment is open sufficiently. The teacher creates such a problem before the pupils which arouses so much mental tension in the pupils that they start solving their problems by formulating and testing their hypothesis as a result of their own motivation and activeness. At last, a time comes when the problem is solved. In short, the teaching of reflective level cooperates in developing creative capacities by providing pupils with the opportunities of developing intellectual behaviour. The real situation is that the human life is a struggle. He has to do his best for achieving his aims of life. Sometimes, the achievement of the aims occurs, without any obstruction, in a natural way. But sometime, human beings have to face numerous obstacles in order to achieve his aims. From this point of view, the provision of the teaching of reflective level is essential for the pupils. It is this teaching level which develops the reflective power of the pupils. As this power develops when they grow up, they can solve their problems of life by reasoning, logic and imagination and they can lead successful and happy life. M.L. Bigge has rightly written about reflective level of teaching while clarifying it, "Reflective-level of teaching tends to develop the class-room atmosphere which is more alive and exciting, more critical and penetrating and more open to fresh and original thinking. Furthermore, the type of enquiry pursued by a reflective class tends to be more rigorous and work producing than pursued at an understanding learning situation.

Model

The credit goes to Hunt for developing reflective level of teaching. Therefore, this teaching model is named as Hunt'sModel of Teaching. Hunt has described the structure of reflective level model in the following steps—

(a) Focus. The reflective level of teaching has the following three objectives—

(i) To develop problem-solving competency among the pupils.

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

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

(b) Syntax. The syntax of reflective level teaching is designed in the following four steps, keeping in mind the individual and social nature—

(i) In the first step, the teacher creates a problematic situation before the pupils.

(ii) In the second step, pupils formulate hypotheses for testing. Remember that more than one hypotheses may be formulated for the solution of a problem.

(iii) In the third step, to verify the hypotheses, pupils collect data. On the basis of these collected data, it is decided whether these hypotheses may help in the solution of the problem or not

.(iv) In the fourth step, hypotheses are tested. Results are derived on the basis of these tests which are original ideas of the pupils.

(c) Social System. In the reflective level of teaching, the classroom environment is open and independent. In such environment, the pupil occupies primary places and the teacher's place is secondary. At the stage, the teacher has three main functions—

(i) To present some problem before the pupils

.(ii) To use discussion and seminar during teaching.

(iii) To raise the level of aspiration of the pupils. All the pupils become active and sensitive for solving the problem. Hence, at this level, both self-motivation of the pupil and the social motivation have importance.(d) Support System. For reflective level of teaching, objective type tests are not useful. The proper evaluation of the pupils' competencies can be done correctly by easy type tests. While examining reflecting level—

(i) the attitudes and beliefs of the pupils should be evaluated,

(ii) their involvement in the learning activities should be evaluated

,(iii) it should be evaluated that how much development of the critical and creative competencies of the pupils have taken place

Features

The following are the limitations and characteristics of reflective level of teaching as described by Hunt

:(i) In reflective level of teaching, no definite programme is followed as in the case of memory and understanding levels of teaching

.(ii) This level of teaching is required for the pupils of higher classes. It is because this level of teaching carries much importance for age and maturation.

(iii) The teaching at reflective level is problem-centered.
(iv) In this level of teaching, only group-discussion method is considered effective.

(v) Reflective level of teaching can not be restricted only to the curriculum, contents and text-books

.(vi) In the reflective level of teaching, pupils can criticize their teachers openly.

Guidelines

Hunt has presented the following suggestions to make the reflective level of teaching more effective—

(i) Teacher should allow those pupils' entry into the reflective level of teaching who succeed in the tests of memory and understanding levels of teaching.

(ii) In the reflective level of teaching, the teacher should follow all the four steps of his level observing the precautions.

(iii) The teacher should raise the level of aspiration of the pupils to make the teaching at reflective level a success.

(iv) In order to eliminate the weaknesses of the teacher, cognitive field psychology should be stressed.

(v) The teacher should create such problematic situations before the pupils in which original and creative thinking may develop in them.

(vi) At the time of teaching, there should be a free and open environment so that the pupils may participate actively in discussion in order to solve the problem.

(vii) The teacher should present the problem before the pupils so that they may formulate the hypotheses after realizing the problem

3.3 Teaching Strategies

Teaching Strategies is a phrase used to indicate applications of various methods and techniques of teaching to achieve the objective of teaching in a given situation. Therefore, the teacher has to

decide which one or combination of more methods and techniques of teaching need practical application in a given situation. These strategies may be defined as "Broad Method Instruction". Remember that there is a lot of difference between a method and a technique. Teaching methods are directly linked with teaching objectives. Hence, each teaching method decides the direction and speed of the teaching. Contrary to this, the teaching technique is not directly linked with the teaching objective, but it is linked with the teaching method. In spite of this, in teaching method, the feeling of "how" works, but the main spirit of teaching technique is—"with what". Not only this, teaching method also emphasizes proper and systematic planning of the content, while technique emphasizes psychological and logical aspect and hints those ways by which the teaching can be made impressive

3.31Meaning

According to the Collin's English Gem Dictionary, 1968 the strategy means the art of war or the skill of war. In Encyclopaedia too, its meaning has been given as an art of deploying army so that a specific goal can be achieved. Hence according to Encyclopaedia, "Strategy is the science or art of planning and directing large military movements andoperations".It is very clear that the strategy is such planning or line of action which is related to the working system. In other words, strategy is that skilful planning of a working system by which the objective can be achieved conveniently. Remember thatthe strategies are never the same. These change according to the changing situations. The word strategy is also being used by the social scientists in social planning, human dynamics and teaching areas B.O.Smith writes about strategy as, "The term strategy refers to pattern of acts that serve to attain certain outcomes and to guard against certain others. It is clear that the word strategy means the determination of some policy by planning before presenting the contents with the help of which the student's force is faced and the teaching objectives are achieved."In this way, the pre-planning of the lesson is key to success. Hence, every teacher should be skilled in this art of pre-planning. Making clearer the meaning of strategy, Stones &Morris have written that, "Teaching strategy is a generalized plan for a lesson which includes structure, desired learner behavior in terms of goals, instruction and an outline of planned tactics necessary to implement the strategy."Attention should be paid that the teaching strategies are more comprehensive than the teaching methods. It is because the teaching methods include only the presentation of contents. Contrary to this, teaching strategy

includes all the aspect like contents, task analysis, teaching objectives, the expected changes in the behavior of the pupils their interests, attitudes, capacities, abilities, needs, mental level and entering behavior etc. In the words of I.K. Davis "Strategies are broad methods of teaching". Their construction includes educational philosophy, teaching objectives, learning principles, desired activities, feedback and motivating tactics

3.32 Nature

The nature of teaching strategies is as follows:

- Teaching strategy exist for specifying the teaching a particular lesson
- Teaching of lesson directed to achieve a set of teaching learning objectives.
- It helps the learner to realize required learning objectives.
- It brings out a scheme, some programme or teaching learning structure which if followed may bring out better achievement of objectives.
- \Teaching strategy requires a number of well planned tactis for its effective implementation. Hence teaching tactics are important component as of teaching strategies.
- It can be modified on the basis of learner's feedbacks and changed teaching – learning objectives.
- It assumes teaching as science and quite techniqual by nature
- Teaching strategy is broad, comprehensive and flexible by nature.

3.33 Functions

The functions of teaching strategies are as follows:

- Teaching strategies function as a mean to realize teaching learning objectives.
- It helps the teacher and learner to make teaching learning simpler and concretize.
- It builds the teaching learning environment by analyzing and identifying the learning resources.
- It orient the learner to design teaching devices, teaching tactic and teaching methods.
- It helps to eliminate obstacle and problems in the way of effective teaching learning process.

3.4 Models of Teaching

Teaching models act as the basis for the indoctrination of teaching theories and, thus, considered as hypothesis for teaching theories, therefore, teaching model contribute to make the teaching effective and interesting because development of teaching models is brought about by keeping in view the learning theories so that the teaching theories may be indoctrinated by using these learning theories. In this way, the teaching models are the basis and the first step for the indoctrination of the theory of teaching. In every model, such situations are created in which an interaction of pupils occurs causing the achievement of the objective by bringing about changes in the behavior. It is to be observed that in each teaching model, a comprehensive and specific outline of teaching is prepared. Its principles are based upon the verified results. In teaching models, the following six activities are included

:(i) To give practical shape to the learning achievement.

(ii) To select stimulus so that pupil may give expected response.

(iii) To specify such situations in which the response of the pupils may be seen.

(iv) To determines such criterion behaviours so that the performance of the pupils may be seen.

(v)To specify the specific teaching strategies for achieving the desirable educational objectives by analyzing the interaction in the class-room situations

(vi) To modify the teaching strategies and tactics if the expected changes in the behaviour do not occur.

According to Joyce and Weil, "A Model of teaching is a plan or pattern that can be used to shape curriculum (long term courses of study), to design instructional materials, and to guide instruction in the classroom and other settings."According to Hyman, model is a way to thinking. According to him, "The model is a way to talk and think about instruction in which certain facts may be organized, classified and interpreted."Again, according to Joyce and Weil, "Teaching models are just instructional designs. They describe the process of specifying and producing particular environmental situations which cause the student to interact in such a way that specific change occurs in his behavior."

Mr. Bruce R. Joyce emphasising the importance of teaching models says, "School Facilities and individual teachers create life in schools by models they choose and create." The main feature of teaching model is that they bring about the qualitative development of teacher's personality. Fundamental characteristics of these teaching models are as follows

:1. Some Assumptions. Each teaching model has certain basic elements which are kept in mind while these models are developed. These basic elements—

(a) Creation of appropriate environment for learning,

(b) Occurrence of an interaction between a teacher and the pupils,

(c) Using proper teaching strategies and tactics for making the teaching easy, clear and understandable. Remember teaching model acts as an outline for creating the environment

2. Presenting Appropriate Experiences. The second characteristic of a teaching model is that it provides proper experiences to both, teacher and the pupil. Remember that selecting the content and presenting it for learning before the pupils is the main problem of teaching. This difficulty is verified when a teacher presents appropriate experience before the students.

3. Answer to Fundamental Questions. The third characteristic of a teaching model is that it provides answer to all the159fundamental questions. For example—

(a) How a teacher behaves?,

(b) Why he does like this?, and

(c) What would be effects of his such behavior on the pupils? In short, in every teaching model, answers to all the fundamental questions pertaining to the behaviors of teacher and pupils are received.

4. Based on Individual Differences. The fourth characteristics of a teaching model are that it is constructed on the basic of individual differences and according to various assumptions. For this reason, we see that some teachers formulating different models of teaching under the influence of their own philosophies of life. Under this influence, they either give importance to rote memory or to the clarification of concepts.

5. Use of Student's Interest. The fifth characteristic of teaching model is to use the student's interest. Herbart's five-step pattern is still an importance base of teaching because its all the five points look after the interests of the pupils.

6. Influenced by Philosophy. The sixth characteristic of a teaching model is that each teaching model is influenced by the philosophy of life. We often observe that a teacher constructs a teaching model to change the behavior of the pupils according to the philosophy of which he is a follower. For example, an idealistic teacher develops the pupil as an idealist and a pragmatist teacher develops a pupils as pragmatist and for this, teachers develop the teaching models according to their philosophies.

7. Maxims of Teaching. The seventh characteristic of a teaching model is that the basis of a teaching model is the maxim of teaching. In other words, the maxim of teaching functions as the foundation in each teaching model and these maxims develop those powers which help in organizing the personalities of the pupils. The readers are requested to read the sixth unit of this book to gain the proper knowledge of maxims of teaching.

8. Practice and Concentration. The eight characteristic of a teaching model is that the development of a teaching modeltakes place as a result of continuous practice and study. Hence, its base is thinking. The development of a teaching model is possible only when the assumptions are made clear by thinking and necessary use of the problem.

9. Development of Human Ability. The ninth characteristic ofa teaching model is that it helps in developing the human abilities. Also, it increases the teacher's social competency.

10. Teaching as an Art. Its tenth characteristic is that the teaching is known as an art. A teaching model encourages the art of teaching.

Fundamental elements of teaching model are:

1. **Focus.** Every teaching model has one or the other objective which is called its focal point. A teaching model is developed by keeping in mind this focal point. In other words, the focus of a teaching model is that for which a teaching model is developed. Remember that the model has various phases. Hence, for this, some particular types of competencies are developed.

2. **Syntax.** The syntax of teaching model means those points which produce activities focussed on educational objectives at various phases. In this way, under syntax, the teaching tactics, teaching activities and interaction between a pupil and the teacher are determined in such a sequence that the teaching objectives are achieved conveniently by producing desirable situations.

3. **Social System.** A social system is according to the focus of a teaching model. Since every teaching model has separate objective, therefore, every teaching model will have separate social system. The real situation is that the every class is society which must has some system or administration. This system is made by the pupil, teacher and the curriculum. The society makes this system active by educational interaction so that the behaviour of the pupils may experience desirable changes. In this way, under the social system, the activities of pupils and the teacher and their mutual relationships are discussed. Hence, the social system occupies an important place in making the teaching impressive.

4. **Support System.** In this support system, it is evaluated by oral or written examination, whether the teaching objective has been achieved or not. In other words, teaching was successful or not. On the basis of this success or failure, a clear idea is achieved regarding the effectiveness of those strategies, tactics and techniques which were used during teaching. Remember that since each teaching model has a separate focus, thereforethe support system for every teaching model would also be separate.

3.41 Types

teaching models are of three types:

1. Philosophical Teaching Models

Israel Saffler had mentioned following types of philosophical teaching models—

(a) The Impression Model of Teaching. It is a common assumption that at the time of birth, the child's brain is blank or empty. Whatever experiences are provided through teaching they go on learning the impressions on the child's brain. These impressions are termed as learning. In this process, the feelings of the sense organs and principles of language are given more importance. The success and effectiveness of entire teaching process depends upon the teacher's ability and capability to communicate.

(b) Insight Model. The developer of this model was Plato. His belief was that the knowledge cannot be provided merely by speaking the words or by merely, listening them. Mental processes

and language both work together. This model is an answer to the impression model. This insight model discards the assumption of impression model that the meaning of a teaching model is merely to deliver the knowledge or ideas through teaching to the mental domains of the pupils. It is the belief of insight model that the knowledge cannot be provided merely through the expressions of sense organs, but knowledge of the content is also essential for this.

(c) The Rule Model. Kant gives importance to logic power. In logic, certain rules are followed. The main function of education is to develop the character. The objective of rule model is to develop the capacities of the pupils. The impression model and insight model have their own limitations. Their drawbacks have been removed by the rule model. In this model, more importance is given to the logic power. For this function, some particular rules are followed, such as planning of teaching, organization and interaction occur under specific rules. Cultural and moral values are developed with this model

3.411 Psychological models

It is the assumption of psychologists that the teaching models can acquire the place of teaching theories. In short, it can be stated that the teaching models are the primitive form of teaching theories. In the psychological teaching models, the relationship of teaching objectives and teaching-learning activities are explained.

John P. Dececco has given the following psychological teaching models:

(a) A Basic Teaching Model. This model was developed by Robert Glaser. He has used psychological laws and principles in this model. This model has the following elements:

(i) Instructional Objectives.

(ii) Entering Behavior

.(iii) Instructional Procedure.

(iv) Performance Assessment

.(i) Instructional Objectives. These objectives mean those activities which a teacher has to do before teaching. In other words, the objectives of teacher and pupils are called instructional

objectives. This process is also known as task description. By this element, we can differentiate the objectives of schools, teachers and pupils.

(ii) Entering Behaviour. Entering behaviours mean those abilities or behaviours of the pupils which are necessary for the understanding of contents. In simple words, in order to acquire the level according to teacher's expectations, in future, the present level of pupils' knowledge and skills is the entering behaviour. Entering behavior exists where the instructions start.

(iii) Instructional Procedure. This element means those teaching activities which are used for the presentation of the contents. Instructional process is known as the practical aspect of teaching. In this aspect, various methods, techniques, strategies etc. are used.

(iv) Performance Assessment. This step means those tests on the basis of which a teacher takes decisions. He decides the limits upto which a pupil has acquired the efficiency in the contents. In this step, performance may be measured by any method, but it should be valid, reliable, objective and efficient. Hence ,the tests which are used in this step should be objective and efficient.

(b) A Computer based Teaching Model. The teaching model was developed by Lowrence Stuloro and Daniel Davis in1965. This is the most complicated model. This model has the following elements—

(i) Entering behaviour of the pupil.(ii) Determination of Instructional objectives.(iii) Teaching aspect—In this element, computer teaching is selected according to the entering behaviors of pupils and instructional objectives. The performances of the pupils are evaluated. If the evaluation is satisfactory, then another teaching plan is presented. In this model, the teaching and diagnosis go side by side. On the basis of diagnosis, remedial teaching is provided. In this model, individual differences are also given importance.

(c) A Teaching Model for School Learning. This model was developed by John Carol. His assumption was that the time according to the needs of the pupils is considered as important and essential component. This model has the following important elements—(i) Definition of objectives in behavioural terms.

(ii) More importance to intelligence and performance or achievement in entering behaviours.

(iii) The level of instructions should be according to the pupils.

(iv) To provide appropriate time for learning according to the needs of the pupils.

(v) For achievement, the pupils should have mastery. In this model, in the process of instruction, the pupils are provided with full opportunities. They are provided with time according to their needs in order to control the individual differences. Its main drawback is that the achievement tests cannot be administered in a systematic way.

d) An Interaction Model of Teaching. Its another name is— Neel A. Flander's (1960) social interaction model-1. Flander has considered teaching process as an interaction process.Flander has divided class-room behaviours in ten categories. It is also known as Flander's Ten Category System. In this model, the behaviours of teachers and pupils are analyzed. This model has the following elements or aspects—

(i) Objectives or Focus—The nature of interaction between a teacher and pupils is determined.

(ii) Entering Behaviours—It includes pupil's feeling ideas and current information.

(iii) Presentation—Verbal interaction occurs between a teacher and pupils which extends to the indirect effect.

(iv) Evaluation—In this, the achievement or performance are evaluated by tests and the effectiveness of the interaction is decided. It is evident in this model, an interaction between a teacher and the pupil is more emphasized. In this model, the analysis or observation of non-verbal interaction cannot be made. Another drawback of this model is that no decision can be taken regarding the contents in this model

3.412 Modern Models of Teaching

Bruce R. Joyce has divided all the teaching models, under the title "Modern Teaching Model", in the following four categories—

(a) Models based on Social Interaction Source.

(b) Models based on Information Processing Source.

(c) Models based on the Personal Source.

(d) Models based on Behaviour Modification as Source

.(a) Models based on the Social Interaction Source. In the models based on the social interaction source, the social aspects of human beings are kept in mind and their social development is more emphasized. As the human nature emphasizes the social relations more, therefore, its analysis comes under this teaching model. Remember that the use of models based on the social interaction sources can be used successfully in democracy. The social interaction source includes the following types of models—

- **Classroom Meeting**: Strengthens self understanding and responsibility towards self and others. This model has rules and structure and specified intentions It is developed by William Glaser.
- **Cooperative or Collaborative Learning:** Collective arrangement and division of tasks, sharing results and ideas. There are a number of authors claiming this model – significantly Johnson and Johnson, and also Robert Slavin. There are also cooperative models that have more specific purposes like the Jigsaw Model.
- **Graffiti Model**: Graffiti is a cooperative learning structure in which students are asked to give written responses to questions posed by a teacher
- **Group Investigation**: Focuses on interpersonal group skills as students engage in acquiring information. Major theorist for this model are Hebert Thelen and John Deway. It focuses on development of skills of participation in democratic social process through combined emphasis on academic enquiry skills.
- **Jigsaw Model**: Originally, the jigsaw concept was developed in the 1960's to facilitate racial integration. As an educational model it falls into the Social Family of methods. There are several variations of this model. The **jigsaw** technique is a method of organizing classroom activity that makes students dependent on each other to succeed. It breaks classes into groups and breaks assignments into pieces that the group assembles to complete the (jigsaw) puzzle. It was designed by social psychologist Elliot Aronson to help weaken racial cliques in forcibly integrated schools. The technique splits classes into mixed groups to work on small problems that the group collates into a final outcome.

- **Jurisprudential**:Developed by Donald Oliver and James P.Shaver. It is designed primary to teach the jurisprudential frame of reference to solve social issues
- **Laboratory Method**: Group/interpersonal skills, personal awareness, and flexibility skills are stressed in this model.(National Training laboratory Bethel, Maine)
- **Role Playing**: Role play as a teaching strategy by Frannie Shaftel and George Shaftel– In role play students assume roles and become the source of their inquiry.
- **Sociodrama** – Students assume roles, acting out issues in order to facilitate awareness and understanding about concepts or important issues
- **Social Inquiry**: Problem solving using social issues (Bryon Massials and Benjamin Cox)

(b) Models based on Information Process Source. In the information process source, the pupils are provided with the knowledge of the facts and necessary information. In these models, the solution of the problem and knowledge of stimuli are provided by creating effective environment. These models have proved useful for developing intellectual competencies of the pupils. This information source includes the following six types of models:

- **Advance Organizer Model**: It is designed by David Ausubel to increases the efficiency of information-processing capacities. There are several kinds so there is a lot of possibilities and varieties – expository, narrative, skimming, or graphic.
- **Cognitive Growth Development**: It is designed by Jean Piaget, Irving Sigel, Edmund Sullivan. It mainly focuses on general intellectual development especially logical reasoning.
- **Cognitive Views of Learning**: Focuses on the processes within the learners. Strategies are developed to encode and retrieve information (Kauchak & Eggen, 1998)
- **Critical Thinking**: Deals with a series of dialogs and exercises designed to get students to think at higher levels and at levels that engage critical appraisal or critical thinking. (Paul, 2005)
- **Inductive Thinking Model/Inquiry Training Model:** Focuses on the development of inductive mental processes and academic reasoning or theory building.But these capacities are useful for personal and social goal as well. This model includes the work of Hilda Taba.

- **Concept Attainment**: Focuses on developing inductive reasoning & conceptual knowledge development and analysis. It is developed by Jerome Brunner.
- **Inquiry Training:** Engages students in causal reasoning, and aids then in developing hypotheses. It provides training in systematic enquiry. It is designed by Richard Suchman.
- **Learning Styles Model**: These plans are devised and written reflecting concepts developed by one of the learning style theorists or followers (such as Kathleen Butler or Bernice McCarthy, Dunn and Dunn, etc.)
- **Memorization:** Improves memory capabilities through a variety of methods and tricks.
- **Multiple Intelligences:** MI plans utilize, or are based on, those **8 intelligences** described in the work of Howard Gardner..
- **Multi-modal Learning Model**: These plans reflect varied modalities used to encode and retrieve learning. There are generally two basic variations – **VAK** (visual, auditory, kinesthetic) and **VARK** (visual, aural, reading, kinesthetic).
- **Picture Word Inductive** or **PWIM** – Developed by ***Models of teaching*** author Emily Calhoun this model is geared to help children in developing sight and written vocabulary drawing on commonly familiar words.
- **Scientific Inquiry Model**: Instructor teaches students the research system of a subject or discipline. Problem solving may be utilized in this model. It is designed byJoseph J. Sehwab . It is designed to teach research system of a discipline.
- **Synectics**: Creative problem solving (Gordon, W. J. J. [1961] and also George M. Prince) In earlier versions of this model it was placed in the Personalist category, later versions place in in the Information Processing format.
- **Taba's Inductive Reasoning Model:** Advanced thinking can be taught through a series of steps designed to be an active transition between an individual and data. This is a very powerful model .

(c) Models based on Personal Source: In the models based on personal source, the personal development is essentially emphasized. In such models, more emphasis is given to the development of internal and external powers of the pupils by developing their affective domain which facilitates the development of self-imagination and self-understanding. The following are the personal source dominated models—

- **Nondirective teaching**: Focuses on self-awareness, understanding, autonomy, and self-concept . It is based on Carl Roger's work. According to him positive human relation helps individual to grow. Here teacher helps students to explore new ideas. Students have freedom to making decisions and choices. Teacher and students are partners in learning. Teacher Nurtures and moulds students to be the way they are and Encourages students to think and reflect their uncertain feelings and become better and be positive.
- **Developing Positive Self-Concepts** : It appreciates the talent and abilities one possess. Positive self concept evolves through moral values which should be emphasized among students. Here students gain knowledge and experience by enhancing their interest in in learning through self concept. Teacher provides reinforcement and boost their confidence by giving opportunity to express themselves.
- **Relaxation and stress reduction**: Exploring personal goals for relaxation, or using self-initiated relaxation techniques to calm anxieties in social settings. There are many models that use this theme as a basis.
- **Selection, Detection, Connection Model** – A self-directed teaching model for highly intrinsically motivated high school students.
- **Awareness Training Model.** It developed by Fritz Pearls . It gives emphasis on the development on interpersonal awareness and understanding as well as body and sensory awareness.
- **Synectics Model.** It gives emphasis on development of creativity and creative problem solving . It is designed by William Gordon.
- **Conceptual System Model.** Designed by David Hunt. It is developed to increase personal complexity and flexibility

(d) Behavioural Modification Model. In these models, the desirable changes are emphasized with the help of reinforcement and learning activity in the behaviour of the pupils. The following model is included in the behavioural changes based models—

- **Desensitization**: Replacing anxieties with relaxation
- **Contingency Management**: Deals with facts, concepts, and skills

- **Direct Teaching**: Expert or intermediary offers information this method in probably the oldest method among the teacher-centered models. Also it is more than likely the most universally experienced form of teaching for most of us..
- **Direct Training:** Develops distinctive predetermined patterns of behavior. Like direct teaching an expert shows a novice how to do something. This is readily used in trade schools and in situations where there are gradations of apprenticeship toward a desired skill or goal.
- **Behaviorism**: Emphasized the importance of observable, external events on learning and the role of reinforces in influencing those events (Kauchak & Eggen, 1998)
- **Hunter Model, also Mastery Learning:** – highly structured approach to teaching whereby plans are devised using the classic, repetitive lesson model developed by the late Madeline Hunter
- **Self-control**: Uses a series of rewards and internal dialogs to correct or improve social behavior
- **Simulation:** Students deal with hypothetical or social situations and various processes to help their decision-making skills. Progression to an end goal or specified understanding or outcome is plotted.

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 pattern. It is very essential that teacher must effective to perform adequate behavior to achieve teaching learning objectives. However if teacher shows inadequate behavioral sequences in the classroom the teaching learning objectives could not be achieved. Hence while preparing teacher through pre service and in service teacher education it is needed to implement proper technique to modify teacher's incompetent behavioral pattern into more refined one .

Behavior is defined as something a person does at a particular situation.. Behavior may be increased by following the behavior with a favorable consequence or positive reinforcement. Teacher's behavior: Teacher's 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 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 teacher, a more mature personality and student is less mature personality. In the process of education, teacher helps in developing the student personality by his intimate contact. Behavior Modification: Behavior Modification is a discipline that makes use of learning principles to help pupil cope with or cure a wide range of psychological problems.

In a teacher training program or in service program in the shape of theory and practice is always aimed for bringing the needed modification and improvement in the existing teaching or teacher behavior of the concerned pre-service or in-service teacher. In the field of pedagogy and teacher education program a number of innovation and techniques have been introduced for modification and improvement of teacher's behavior and teacher's communication. These are especially concerned with the process of modifying the ways of interaction with the students and improving one's behavior as a teacher.

Teacher behavior refers to the behavior or communication (verbal and non-verbal communication) maintained and demonstrated by a teacher at the time of carrying out his teaching activities in the classroom along with his students. The term modification and improvement of teaching or teacher's communication and behavior refers to the attempts adopted for bringing desirable improvement in the existing entry behavior of a teacher for helping him to attain the desired terminal behavior in order to exercise his professional duties as effectively as possible. It can be properly modified through the adoption of a variety of techniques including micro-teaching, Flander's interaction analysis category system and etc.

The principles of behaviour modification is "When a behaviour or response is aroused by a stimulus of a situation on a number of occasions, there is great likelihood of the recurrence of that behaviour when the same stimulus of situation is presented later at any other place" There are various feedback devices which are used for the modification of teacher behavior on the basis of this principle.. In teacher education programme behavior modification is done by training on teaching skills , value, pedagogical practice through different technique such as Microteaching, Flender's interaction analysis and Simulation.

3.51Micro teaching

Micro teaching was first introduced at Stanford University, USA in 1963. The Stanford teacher education program staff members sought to identify isolate and build training programmes 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 business, nursing and the army. Research in India and other developing countries have shown that conventional micro teaching methods help to improve teaching competencies.

The teacher in the class room 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 behaviours such as smiling, gesturing and nodding these group 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

Microteaching has been defined in several ways 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 behaviour 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) has given a comprehensive definition of 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 thus be

Microteaching is a teacher training technique involving a specific teaching behaviour/skill for 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.

Some characteristics of microteaching

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

Meaning

Micro teaching represents an appropriate innovative technique for helping the pupil teacher's being trained in the colleges of education in their acquisition of the desired teaching skills. We can define micro teaching 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 it 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 encounters", i.e. reducing the complexities of real normal teaching in terms of size of the class, time and content.

The use of micro-teaching technique in reference to the teacher education program adopted in our country may prove advantageous on account of the specific features and characteristics inherent in this technique, such as, (i) non-dependence over the practicing schools and their students for the practice of skills, (ii) providing opportunity for the practice of one teaching

skill at a time, (iii) reducing the complexities of the normal classroom teaching, (iv) providing appropriate opportunities for systematic observation of the teaching and immediate feedback to bring improvement in one's teaching skill, and (v) providing opportunity to the teacher trainees for the development of their teaching skills in the laboratory like controlled conditions. The micro-teaching procedure adopted for practicing teaching skills in our teacher 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 to10 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 teaches the lesson to another group of pupils. This lesson is also rated by the supervisor and then analysed and discussed with the teacher- trainee.

The steps in a microteaching session are

1. PLANNING

This involves selection of the skill to be practiced, awareness of components of the skill, selection of a suitable concept, writing of micro lesson with specific objectives.

2. TEACHING

The following setting is suggested for the microteaching technique.

Time: 5 minutes

Students: peer group-5 or so in number

Supervisors: 1or 2

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

3. 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 to specific behaviours 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.

4. 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.

5. RETEACH

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

6. REFEEDBACK

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

Indian model of microteaching

The Indian model of micro teaching has the following salient features.

1. The micro lesson is taught /demonstrated under normal conditions with minimum electronic gadgetry; available infrastructure (space, material and equipments) is used as the micro teaching laboratory.
2. Immediate feedback is provided to the trainee teacher by the observers.
3. The duration of the micro teaching cycle is as follows

Teaching	6minutes
Feedback	6 minutes
Replan	12 minutes
Reteach	6 minutes
Refeedback	6 minutes
	36 minutes

The Indian model has been successfully tried out and is used in many of the teacher training institutions in India.

Microteaching Skills

The major premise underlying the concept of microteaching is that the complex teaching act can be split into component skills; each simple, well – defined and limited. These skills can be identified, practiced, evaluated, controlled and acquired through training

A teaching skill has been defined in various ways. A few definitions will clarify the meaning of the term

McIntyre, et al (1977) define teaching skill as "asset of related teaching behaviour which is specified types of classroom interaction situations tend to facilitate the achievement of specified types of educational objectives"

Characteristics of A Teaching Skills

1. A teaching skill is a set of strictly overt or observable behaviours
2. Purely cognitive skills such as problem solving is not considered as teaching skill
3. Teaching skills have three basic components, viz perception, cognition, and action
4. Teaching skills have three dimensions

i) Non-verbal behaviour

ii) Openness, and

iii) Nature of moves in teaching to which the skill belongs Openness, Non verbal behaviour, Nature of moves

A large number of skills have been identified. The first effort made by Allen and Ryan resulted in identifying fourteen skills. Singh, L.C(1979) makes reference to twenty two general teaching skills. Menon, et al (1983) have suggested a list of seventy four skills. These skills have been chosen as they foster teacher – pupil interaction, particularly as they belong to the four areas of motivation, presentation, recapitulation and questioning. These are the skills of set induction, demonstration, blackboard writing, explaining, stimulus variation, questioning and reinforcement.

Skills of Teaching Used in Microteaching

Skill of stimulus variation

- The skill of stimulus variation covers the activities the teacher can introduce to vary the presentation methods used in a lesson. This skill is concerned with three main areas of teaching, they are

1. The manner, voice and teaching style of the teacher
2. The media and materials used during teaching
3. The teacher/ pupil relationship during the class.

Components

1. Movement
2. Gestures
3. Voice modulation
4. Focussing
5. Change in interaction style

6. Pausing
7. Oral- visual switching

Skill of reinforcement

- Reinforcement skill can increase student's involvement in their lessons in a number of positive ways. The skill is being used when the teacher reinforces good behaviour with a smile, when the teacher praises a good answer, or encourages a slow learner. Such positive reinforcement strengthens desirable behaviour, increases student participation. Negative reinforcement, on the other hand weakens undesirable behaviour.

Components

1. Positive verbal
2. Positive nonverbal
3. Negative verbal
4. Negative non verbal
5. Wrong use of reinforcement
6. Inappropriate of reinforcement

Skill of explaining

- Explaining can be defined as an activity to bring about a concept, principle, etc. It is an activity to fill up a gap in someone's understanding. The skill of explaining aims at making sure that the explanation is understood. All teachers should strive to perfect the skill of explaining accurately and effectively.

Components

- **Desirable behaviour**

1. Beginning statement
2. Explaining
   - Clarity
   - Fluency
   - Planned repetition

3. Concluding statement
4. Questions to test pupils understanding

- **Undesirable behaviour**
  1. Irrelevant statement
  2. Lacking in continuity
  3. Inappropriate vocabulary
  4. Lacking in fluency
  5. Vague words and phrases

Skill of probing questions

- Probing is used when the students reply is correct but insufficient, because it lacks depth. Asking a number of questions about the response given to the first question. Such techniques that deal with pupil responses to your question are included in the skill of probing questioning.

The five components of the skill of probing questioning are

1. Prompting technique

Prompting is a technique of probing or going deep into the pupil's initial response and leading him from no response to the expected response. This involves the teacher to give clues or hints to the pupil and ask leading questions.

2. Seeking further information

It consists of asking the pupil to supply the additional information to bring initial response to the criterion level or the expected level.

3. Refocussing

This technique consists of enabling the pupil to view his response in relation to other similar situations. It requires the pupil to relate a completely acceptable answer to other topics already studied by him.

4. Re direction technique

Redirection technique involves putting or directing the same question to several pupils for response. This is mostly used for the purpose of probing and for increasing pupil participation.

5. Increasing critical awareness technique

This technique mainly involves asking "how" and "why" of a completely correct or expected response. It is used to elicit a rationale for the answer.

Advantages of micro teaching

- Micro teaching is useful for developing teaching efficiency in pre service and in service teacher education programmes.
- Micro teaching can be either in real class room conditions or in simulated conditions.
- The knowledge and practice of teaching skills can be given by the use of micro teaching.
- Microteaching is a training device for improving teaching practice and prepares effective teachers.
- It focuses attention on teaching behaviour to modify and improve in the desired direction.
- Micro teaching is an effective feedback device for the modification of teacher behaviour.
- Microteaching minimizes the complexities of the normal classroom teaching by scaled down teaching.
- Micro teaching permits increased control and regulates teaching practice.
- The demonstrations of model lessons in micro teaching are possible through video- lessons and short films.

Drawbacks (limitations) of micro teaching

- Micro teaching tends to reduce creativity of teachers.
- Its application to new teaching practices is limited.
- It requires competent and suitably trained teacher educators for its successful implementation.
- Micro teaching alone may not be adequate. It needs to be supplemented and integrated with other teaching techniques.
- Microteaching is very time consuming technique.
- The list of skills is not exhaustive and does not apply to all subjects.
- Too much fragmentation of skills is not considered convention or practical for training.

- Some skills tend to overlap each other.
- Different skills are required for different stages and for different subjects which are difficult to formulate and achieve. Only a few basic skills such as questioning, explaining, stimulus variation, management of class are common and can be developed.

3.52 Flander's Interaction Analysis

Ned. A. Flanders defines, "Teaching as an interactive process. Interaction means participation of teacher and students in the process of teaching. In this process, teacher influences the students; students also interact with the teacher. Interaction takes place among the students themselves also. It means, in the process of teaching, every body interacts with every other person involved in the process. Flander's system of interaction is known as the most popular technique used for the analysis of the teacher behavior and interaction going on in the classroom at a particular teaching-learning situation. It tries to categorize all the sets of possible behaviors while interacting with his students in ten categories divided into three major sections, namely: (i) teacher talk, (ii) student talk, (iii) silence or confusion. The application and utilization of Flander's interaction analysis mainly involves three major steps: (i) observation and recording of the classroom events, (ii) construction of the interaction matrix, and (iii) interpretation of the interaction matrix

Teacher influences students through lecture, ask questions, criticizing, giving directions etc.

- Student"s reacted to the teacher"s lecture and questions, they give responses.
- It is interaction between teachers and students.

What is Interaction Analysis?

- Interaction analysis is a process of encoding and decoding a pattern of interaction between the communicator and the receiver.
- Encoding helps in recording the events in a meaningful way and decoding is used to arrange the data in a useful way and then analyzing the behaviours and interactions in the classroom interaction.
- There are four important techniques to observe the interaction systematically. These are:

1. Flander"s Interaction Analysis Categories System (FIACS)

2. Reciprocal Category System (RCS)

3. Equivalent Talk Categories (ETC)

4. Verbal Interaction Category System (VICS)

Flanders Interaction Analysis Technique is most suitable and widely used technique in the field of research all over the world.

Characteristics of Interaction Analysis

1. The classroom verbal interaction can be made more effective.

2. The teacher can increase student participation in his teaching.

3. The direct behaviour of teacher may be shifted to indirect behaviour, which is more suitable in democratic way of life.

4. The tape recorder and videotape can be used for recording the classroom events. The trainee can encode and decode his own behaviour.

5. This technique can also be combined with other feedback device such as microteaching and simulated teaching.

Flander's Interaction Analysis Category System (FIACS)

- Ned. A. Flanders developed a system of interaction analysis to study what is happening in a classroom when a teacher teaches. It is known as Flanders Interaction Analysis Categories System (FIACS).
- Flanders and others developed this system at the University of Minnesota, U.S.A. between 1955 and 1960.
- Flanders classified total verbal behaviour into 10 categories. Verbal behaviour comprises teacher talk, student talk and silence or confusion.
- The ten categories are mentioned as under:

1. Teacher Talk – 7 categories

2. Pupil Talk – 2 categories

3. Silence or Confusion- 1 category

Thus, the first seven categories include teacher talk. Next two categories include pupil talk. The last tenth category includes the small spans of silence or pause or confusion.

The first 7 categories or teacher talk has been bifurcated into a) indirect talk, b) direct talk.

A) Indirect Talk

In this method of analysis, the first four categories represent the teacher‟s indirect influence.

Meaning of Various Categories

1. Teacher Talk (7 Categories)

Category 1: Accepts Feelings

- In this category, teacher accepts the feelings of the pupils.
- He feels himself that the pupils should not be punished for exhibiting his feelings.
- Feelings may be positive or negative.

Category 2: Praise or Encouragement

- Teacher praises or encourages student action or behaviour.
- When a student gives answer to the question asked by the teacher, the teacher gives positive reinforcement by saying words like „good‟, „very good‟, „better‟, „correct‟, „excellent‟, „carry on‟, etc.
- **Category 3: Accepts or Uses ideas of Pupils**
- It is just like 1st category. But in this category, the pupils ideas are accepted only and not his feelings.
- If a pupil passes on some suggestions, then the teacher may repeat in nutshell in his own style or words.
- The teacher can say, „I understand what you mean‟ etc. Or the teacher clarifies, builds or develops ideas or suggestions given by a student.

Category 4: Asking Questions

- Asking question about content or procedures, based on the teacher ideas and expecting an answer from the pupil.
- Sometimes, teacher asks the question but he carries on his lecture without receiving any answer. Such questions are not included in this category.

B) Direct Talk

- Next 5th to 7th categories represent the teacher‟s direct influence.

Category 5: Lecturing /Lecture

- Giving facts or opinions about content or procedure expression of his own ideas, giving his own explanation or citing an authority other than a pupil.

Category 6: Giving Directions

- The teacher gives directions, commands or orders or initiation with which a pupil/student is expected to comply with,
- - Open your books.
- - Stand up on the benches.
- - Solve 4th sum of exercise 5.3.

Category 7: Criticizing or Justifying Authority

- When the teacher asks the pupils not to interrupt with foolish questions, then this behaviour is included in this category.

1.Teacher‟s „what‟ and „why‟ also come under this category.

2. Pupil Talk (2 Categories)

Category 8: Pupil Talk Response

- It includes the pupils talk in response to teacher‟s talk
- Teacher asks question, student gives answer to the question.

Category 9: Pupil Talk Initiation

- Talk by pupils that they initiate.
- Expressing own ideas; initiating a new topic; freedom to develop opinions and a line of thought like asking thoughtful questions; going beyond the existing structure.

3. Silence or Pause or Confusion (1 category)

Category 10: Silence or Pause or Confusion

- Pauses, short periods of silence and period of confusion in which communication cannot be understood by the observer.

Procedure of Observation / Encoding Procedure

- The observer sits in the classroom in the best position to hear and see the participants.
- At the end of every three seconds he decides which category best represents the communication events just completed. Thus the time involves in coding one tally for every 3 seconds, is 20 tallies in one minute, 100 tallies in 5 minutes and 1200 tallies in one hour.
- In this process only the serial numbers of the categories are recorded.
- The serial number of that category is recorded on the data sheet by the observer.
- When the observation is over, the observer shifts to some other room and prepares the details on the basis of those serial numbers of the categories.
- In this observation process, the writing of serial numbers of the categories is known as Encoding.
- Writing details of behaviour on the basis of these categories is known as Decoding.
- The observers should remember the serial numbers of these categories.

Rules for Observation / Rules for Recording or Decoding

Flanders category method has many rules for observation without following which the observation is not possible. The observer must remember these rules. These rules help in maintaining consistency and making observations uniform. These rules are as follows:

Rule 1: If more than one type of category occurs during a 3 second period, the observer should choose the category that is numerically farther from category 5 (but not category 10). Suppose the observer is in doubt whether the category is 2 or 3; he should write 2 categories.

Rule 2: The observer should not involve his personal viewpoint.

Rule 3: If more than one category is active in a span of 3 seconds, and then all the categories should be recorded. If after 3 seconds, no category changes, then the same serial number should be repeated in the next 3 seconds.

Rule 4: If the time period of silence exceeds 3 seconds, it should be recorded under the category No.10

Rule 5: When teacher calls a child by name, the observer is supposed to record a 4th category.

Rule 6: When the teacher repeats the student‟s answer and the answer is a correct, that is recorded as a category No. 2. This tells the student that he has the right answer and therefore functions as praise or encouragement.

Rule 7: When a teacher listens to a pupil and accepts his ideas for a discussion, then this behaviour belongs to category No. 3.

Rule 8: The words „All is ok‟, „yes‟, „yah‟, „hum‟, „alright‟ etc belong to the category No. 2. (Encouragement)

Rule 9: If a teacher jokes without aiming at any pupil, this behaviour belongs to the category No. 2. But if he makes any joke aiming at some particular pupil, then it belongs to the category No. 7

Rule 10: When all the pupils respond to a very small question collectively, then the serial number of category-8 is recorded.

3.53 Simulation

Simulation technique is utilized to induce certain behavior in a artificial environment. In this technique pupil teacher need to play several roles such as teacher, student and supervisor. It involves practice based social drama. Simulation is utilized to introduce the novice teacher into teaching in non stressful condition. It is defined as mechanism of feedback devices to induce certain desirable behavior among pupil teacher by playing the role of teacher in their own groups an artificial situation of classroom teaching.

Assumptions

- The teacher behavior can be modified by feedback devices
- There are certain behavioural Pattern is required for effective teaching which can be strengthened by practice like a skill.
- The teacher behavior has its own taxonomy.
- Social skills are developed by practiceand imitation in a group. All members in a group have an opportunity to practice in controlling and improving their own behavior for teaching purpose.

Steps.

- The pupil teachers are assigned with certain roles such as teacher, student, and observer.
- Social skills are discussed which are to be practiced with respect to concerned topic.
- Schedule of simulation is organized with respect to design of the artificial activities and distribution of responsibility is done. For example in a simulation programme it is decided that who will do what at what situation and time.
- The procedure and technique of observation is decided.
- The schedule is followed for first practice session. The teaching is organized and observations are taken for evaluating the teaching tasks of the performer. The teaching is followed by discussion and demonstration to provide feedbacks to pupil teacher by giving the awareness of social skills of teaching and suggestions for further improvement.
- The next step is by changing the topic, teacher, pupil, observer and social skills the next simulation will be started. The topic and social skills should be challenging one.

Elements

The elements of a simulation activity include teacher, pupil and observer. They have three functions such as Diagnosis, Prescription and evaluation.

Advantages

- This technique enables the pupil teacher with close link between theory and practice.
- Student teacher can get opportunity to analyze and identify problems appearing in teaching .
- Student teachers Acquire classroom manner thought and feelings.
- Student teacher can identify classroom level behavioral problems and Students can develop insight and strategy to counter those problems.
- This technique makes the student teacher more confidence and motivate them to develop teaching skills and avoid the risk of actual classroom encounter.
-

3.5 Let us Sum up

In this unit you have learnt about the level of teaching as memory, understanding and reflective level. In addition to this you got an idea about the teaching strategies and their nature. You also explored philosophical, psychological and modern models of teaching in detail. Further you found different way and means to modify behavior of teacher in terms of microteaching, Flender interaction analysis and simulation. Overall we expect that this unit will motivate you to teach and design instructional material based on relevant teaching level, model and strategy to promote educational technology.

3.6 References

Aggarwal, J.C (2012): Essentials of Educational Technology: Teaching Learning Innovation in Education, Vikas Publishing House Pvt Ltd. New Delhi

Rao, U. (2012): Educational Technology, Himalaya Publishing House, Mumbai

Sharma, A.R (2009): Educational Technology, Aggarwal Publications, Agra

Sharma, Y.K (2012): Fundamental Aspects of Educational Technology, Kanishka Publishers And Distributors, New Delhi

Mangal, S.K and Mangal,U (2011): Essentials of Educational Technology, PHI Learning Pvt. Ltd, New Delhi

Chattaraj, Syamaprasad : Shikha Prajukti, Central Library, Kolkata

Sen, Molay Kumar (2012) : Shikha Prajuki Bigyan, Soma Book Agency, Kolkata

yman, R. T. (1970). *Ways of teaching*. New York, NY: J.B. Lippincott Company.

Joyce, B. & Weil, M. and Calhoun, E. (2008). *Models of teaching, 8th ed*. Englewood Cliffs, NJ: Prentice-Hall. (there is now a 9th, 2014 edition)

Kauchak, D. P. & Eggen, P. D. (1998). *Learning and teaching: Research-based methods*. Needham Heights, MA: Allyn and Bacon.

Miller, J. P., Cassie, B. J. R., and Drake, S. M. (1990). *Holistic learning: a teacher's guide to integrated studies.* Toronto, Ontario: The Ontario Institute for Studies in Education (OISE Press).

Miller, J. P. (1988). *The holistic curriculum*. Toronto: The Ontario Institute for Studies in Education (OISE Press).

http://thesecondprinciple.com/teaching-essentials/models-teaching/

https://www.scribd.com/doc/57768891/99/Understanding-Level-of-Teaching

UNIT-IV

Programmed Instruction

UNIT-IV -Programmed Instruction

4.0 Introduction

An educational technologist must be aware of the techniques and approaches to prepare self instructional materials that can perform the tasks of a teacher. In our previous unit we have discussed several theories, models, strategies of teaching and communication. Those principles can be transformed into the software and hardware components of educational technology for effective learning process. In other words the educational technician can build relevant and efficient learning resource for the students by organizing concepts through planned way which is nothing but the programmed instruction.

4.1 Objectives

After studying this unit you will be able to

- Define programmed instruction

- Classify programmed instruction into different types
- Develop Programmed Instructional Material
- Explain teaching machine and Computer assisted Instruction
- Explore researches in Educational Technology
- Predict future priorities in educational technology

4.2 Origin of Programmed Instruction

Programmed instruction is an innovation in the field of individual learning process. It is the type of instruction where learner can control the learning process easily without instructor. Programmed instruction is an strategy for self learning or auto instruction. It provides such a type of resource material through printed or software form which is prepared in a pre planned and controlled way to promote individual instruction with learner's own pace. It is prepared to promote distance or open learning that helps the learner to learner beyond formal environment of education with the additional advantages of drill, practice, self evaluation and motivation. It is a method of presenting new context to students through consequent sequences in a controlled manner.

There are various origins and flavors of programmed instruction. The most important to subcategories are based on the theory of Skinner. Originally introduced in the mid-1950s by behaviorist B.F. Skinner, programmed instruction is a system whereby the learner uses specially prepared books or equipment to learn without a teacher. It was intended to free teachers from burdensome drills and repetitive problem-solving inherent in teaching basic academic subjects like spelling, arithmetic, and reading. Skinner based his ideas on the principle of **operant conditioning**, which theorized that learning takes place when a reinforcing stimulus is presented to reward a correct response. In early programmed instruction, students punched answers to simple math problems into a type of keyboard. If the answer was correct, the machine would advance to another problem. Incorrect answers would not advance. Skinner believed such learning could, in fact, be superior to traditional teacher-based instruction because children were rewarded immediately and individually for correct answers rather than waiting for a teacher to correct written answers or respond verbally. Programmed instruction quickly became popular and spawned much educational research and commercial enterprise in the production of

programmed instructional materials. It is considered the antecedent of modern computer-assisted learning.

The origin of programmed instruction can be discussed as follows:

Skinner's operant conditioning: Programmed instruction is based on skinner's operant conditioning theory which is a behaviorist theory stating that learning is change in behavior, i.e. the individual's response to events (stimuli). Behavior can be conditioned by rewarding the right stimulus-response patterns..The basic principle of

1. Behavior that is positively reinforced will reoccur; intermittent reinforcement is particularly effective
2. Information should be presented in small amounts so that responses can be reinforced ("shaping")
3. Reinforcements will generalize across similar stimuli ("stimulus generalization") producing secondary conditioning

Skinner argued strongly against teaching that is based on punishment

Definition

Programmed instruction has been defined in various ways:

According to J E Espich and Bill Williams, (1967) "programmed instruction ps a planned sequence of experiences, leading to proficiency, in terms of stimulus- response relationship that have proven to be effective."

According to Susan Markle, (1969), "programmed instruction is a method of designing reproducible sequence of instructional events to produce a measurable consistent effect on a behaviour of each and every acceptable student."

N.S. Mavi (1984) Programmed instruction is the technique of converting the live instrumental process into self learning or auto instructional readable material in the form of micro sequences

(the segment of subject matter) which the learners are required to read, make some right or wrong response, correct wrong responses to confirm the right response and attain complete mastery of the concepts explained in the micro sequences.

Learning from programmed instruction on a learning machine usually includes:

- a carefully designed course with predefined sequence of units,
- very small units delivering only a small amount of new information so it is easily understandable (shaping),
- immediate answer after filling in the missing information (reinforcement)
- moving on to the next unit based on the correctness of the given answer.

The principles of Programmed instruction includes

- Principle of small steps
- Principle of active responding
- Principle of a immediate reinforcement
- Principle of self pacing
- Principle of student testing

Nature

- The subject matter is broken down into small steps called frames and arranged sequentiallyFrequent response is required by students
- There is immediate confirmation of right answer or correction of wrong answer do.ne by learner i.e. self correction nature.
- 'The content and sequence of frames are subjected to actual try out with students and are revised on the basis of data gathered by programmer which denotes diagnostic nature.
- Each student progress at his own pace without any fear and any humiliation as heterogeneous class.
- Programmed learning material contains the assumption about the learners clearly.
- The material also contain the objectives of programme in operational terms.
- An interaction is emphasized between the material and learner.

- Facility of continuous evaluation is the nature of programmed instruction.

Advantages

- Programmed instruction enhances =srtudent's critical thinking ability and power of judgement.
- In short period of time students can learn huge content.
- It enhances independent learning without teacher, roution class.
- It improves the quality of education.
- It helps for individual learning and avoids social and emotional problems.
- Small frames or segments of content enriches the interest of leaner and helps to diagnose learning problem.
- Students are active participants in learning.
- It immediately provides result of progress.
- It is very helpful for distance learning.

. Disadvantages

- It limits students in creativity and originality
- Preparation of material is time consuming
- It is only fruitful for individual learning and students may get separated from society.
- It restricts student teacher communication and relationship.
- Doubts cannot be resolved through this instruction immediately as formal education..

4.3Types of programmed Instruction -Linear and Branching

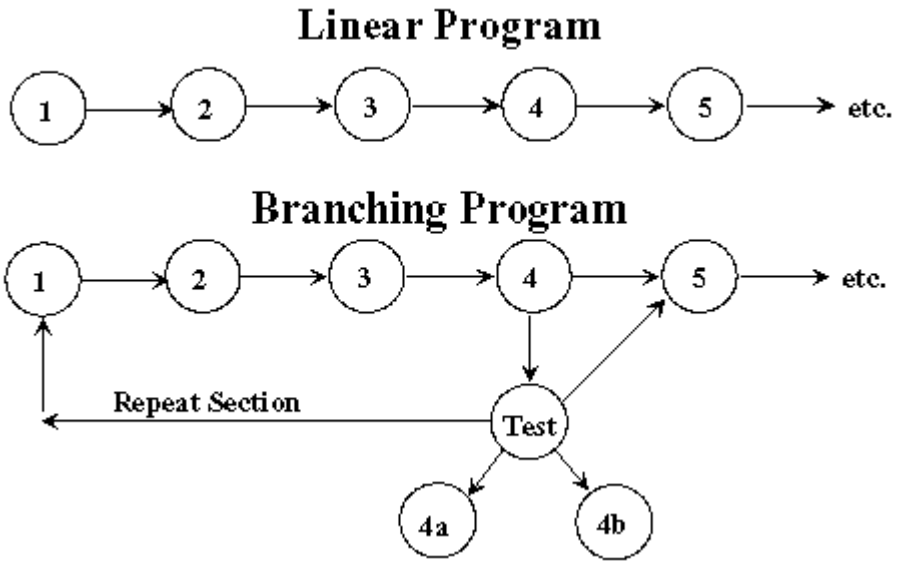
Two types of programmed learning can be compared. Linear programming involves a simple step-by-step procedure. There is a single set of materials and students work from one problem to the next until the end of the program. Branching programming is more complex. Students choose

from multiple-choice answers and then are prompted to proceed to another page of the book depending on their answer. If a correct answer is given, students move on to another page with more information to learn and more questions to answer. An incorrect answer leads to comments on why the answer is incorrect and a direction to return to the original question to make another selection.

Hence there are two types of programming.

1. Linear Programming.

2. Branching Programming.



Linear Programming:

The application of operant conditioning model of teaching is known as 'linear programming' or 'Skinnerian programming' or 'Extrinsic programming' propounded by B. F. Skinner (1954). This programmed material is based on operant conditioning theory of learning where contingencies of reinforcement are properly arranged which shapes up the behavior of an organism in a desirable manner. A linear programming of instruction is one in which the learner is allowed to study only one frame at a time. A frame is the smallest bit of information that is

supplied to a learner at a time. The frame is followed by a question. When learner gets feedback the confirmation of his answer, he is supplied the next frame. This process goes on till the last part of the subject-matters. Here learner goes ahead in a straight line fashion. Every learner is supplied the same series of tasks and each of them fulfils the task according to their individual rate of learning.

The founder of this programming is B.F. Skinner. It is based on theory of operant conditioning. It tells that "A Certain direction can be given to human behavior", for this purpose activities is needed to divide in small parts and make their analysis.

In a linear programme learner's response are controlled externally by programmer sitting at a distance place. A loinear programme is called straight line programme as the learner starts from his initial \behaviour to the terminal behaviour following a straight lin. The student proceeds from one frame to the next until he completes the programme

Characters

- Learners get opportunity to read small amount of information and proceed from one frame to other in a logical sequence.
- Learners exposed to questions regularly so that they give responses in which their correct response are rewarded and wrong responses are corrected.
- Provision of instant feedback is there in linear programme.
- Self pacing provision is available for learner in linear programme

  Scopes:

  The scopes of linear programme is vast at elementary , secondary and distance education. The problems of single teacher, lack of infrastructure can be overcome through linear programmed instruction at elementary level. Remedial instruction, individual learning, versatile curriculum instruction, individual interest of learner can be satisfied at secondary level through this programme. Linear programme is also a boon for distance learner who prefer to learn according to their own pace, interest, ability and convenience without rigid time , teacher or formal classroom setting.

Principle of Linear Programming:

The assumption behind the linear programming is that student learns better if content is presented in small units, student response if immediately confirmed, results in better learning, student's error create hindrance in learning. Student learns better in Laissez fairy environment.

Frame size in small steps; include only one element of topic at a time. Each step is complete in itself. It can be taught independently and can be measured independently. Frame structure is based on stimulus-response-reinforcement. There are four types of frames. Introductory frames, Teaching frame, practice frames and testing frames.

Responses in linear programming are structured responses and are controlled by programmer and not by learners. Immediate confirmation of correct responses provide reinforcement, wrong responses are ignored.

Linear programming is based on five fundamental principles:

• Principle of small steps : In this programming a student acan proceed from little known subject content and attain mastery over the content through many small segments or packet of information with own pace.
• Principle of active responding: It is based on learning by doing where learn has to work by responding the questions and challenges.
• Principle of immediate confirmation: This principle is based on the reinforcement to work on the programme to make learners learn through instant feedbacks to response.
• Principle of self-pacing : The student can work each step as slowly as he is able to do and think.If pace of classroom is too fast or too slow the child will not learn properly as with his own pace.
•Student-testing: You will find this pprinciple in each linear programmed instruction that promotes self evaluation at the end of each frame.

Types of Linear Programme:

- Construct Response: It is Skinnerian type in which the learner has to construct response while going through formats of programme text.

- Multiple Choice Quistion: In this type students get opportunity to respond multiple choice question where learner has to select the responseon each frameand it is presented in discrimination frame sequence type of programme.
- Conventional Chaining: in this type of formats each frame it is connected to2nd frame which becomes a part of the stimulus of the 3rd and so on the down line.
- Skip Linear: It uses the skipping device as it solving problems of review and over review where a bright student may skip the simple programme .
- Criterion Frames: This is used to direct the learner along linear path according to their responses at those critical situations. This frame decides whether the learner should go through the particular sequence or not.
- Ruleg System: Here the content is organized in terms of rules first and then examples. The rule is given a complete form and the examples are in incomplete form . A learner hads to construct response to complete the example.
- Egrule System: It is just the opposite of the ruleg system. The content is organized in terms of examples and then rules. The examples are given in complete form and the rule is in incompleteform.

Limitations of Linear programming-

1. No freedom for student to response.
2. Based on learning theories which were formulated by experience conducted on animals. A human being is more intelligent, than animals, he has got an intelligent brain.
3. Every learner has to follow the same path; therefore, student may cheat from one another.
4. Wrong responses are avoided in the programme. No remedy is provided for them.

Branching programming

This program was developed by Norman A. Crowder (1960). It consists of rather long frames that often appear as pages in an ordinary book form. The student reads the page or frame and then responds by collecting the correct alternative in a multiple choice item. The correct response directs the students to frame which confirms his response and introduces a segment of new materials. This system takes into account the individual differences and provides the necessary remedial material according to the students needs. It has been developed by keeping the individual needs, interests, and attitudes of learners.

Principles of Branching Programmed Instruction:

Frame size is large. There may be a Para or page in the frame. Frame structure is Exposition-Diagnosis- Remediation types. Responses not rigidly structured and responses are selected by learner and not by the programmer. Confirmation of correct responses provides reinforcement. Wrong responses also help in diagnosis of weaknesses of the learner. Remedy is provided on the basis of diagnosed weaknesses of the learner. Error helps in diagnosis of the weaknesses of learner. More than 20% error rate can be accepted. The purpose of Branching programming is to draw out weak points of learner and provide remedy for recovering those weaknesses.

• Principle of Exposition : Students can learn better if she is exposed to whole situation or content. Here the whole concept is presented to the learner so that learner can learn properly the full information which is provided in the home page.. It has two purposes teaching and learning.
• Principle of Diagnosis : Here the weak point of learner is identified after exposition and hence one can assess whether the learner could learn what the causes are for it and then it can be modified. Thus it can be said that students' error helps in diagnosing the weakness.

- Principle of Remediation: Learner can learn better if remediation is provided side byy side. If a learner choose wrong alternatively , then thr learner has to move to a wrong page where remedial instruction is provided and directed to return tio the hopme page and she asked to choose the right answer.
- Principle of Democracy: Student learns better in democratic environment.

Types of Frame :

The programmed text is called “Scrambled text” which consists of two types of pages one home page and another wrong page There are two types of frames in Branching ProgrammeHome page (for teaching and diagnosis) & Wrong pages (for remediation).

- Home Page: This page consist of content or concepts and followed by multiple choice questions. This page involves four aspects:

(i) Teaching: The learner goes through the instruction to comprehend the information.

(ii) Response: At the end of instruction multiple choice is given to the learner to choose the correct response which the learner has to discriminate and give response.

(iii) Diagnosis: If learner chooses wrong response. She has tomove to the wrong page. If she chooses right response she moves to the next home page where the rest content is presented.

(iv) Reinforcement: In the beginning of the home page the response is reinforced by confirming it and hence the learner is encouraged through verbal approval or praise.

- Wrong Page or Remedial Frame:

It is meant for

(i) Repeating the student response

(ii) Negative confirmation

(iii) Reason to why she is wrong

(iv) Further explanation in single language

(v) Direction as to why the learner dhould go next

Scopes

Branching programming is used for secondary as well as higher classes. Higher objectives can be achieved such as multiple discrimination etc. It is useful for students of above average and high intelligence. It can also be used in Distance education programmes.

Backward Branching Programmes

If the learner makes an error she has to taken to the remedial frame where she has given some more help for understanding the concept and solving the problem and will be directed to the original frame number one. So the learner goes through the same frame twice by moving back through remedial frame.

Forward Branching Programme

Here whether the leaner is making correct response or wrong response he will be going to the next or new page. If he makes wrong choice he is directed to remedial frame where his mistakes are fully explained, followed by another parallel question from which he goes to the next frame in the main stream

Limitations of Branching programming

1. It does not consider learning process whether learning is taking place or not. Main emphasis is on diagnosing the weakness of learners and providing remedy to them.

2. There is no sequencing of pages. Student finds it difficult to follow the steps. He does not find it exciting or motivating, therefore he does not want to go through these pages.

3. More emphasis on remediation rather than teaching. Hence, it is only a tutorial approach.

Development of the Programmed Instructional Material

For the development of Programmed Instructional materials the steps to be followed are

- Preparatory phase
- Writing Phase
- Validation Phase

Preparatory Phase: It involves

- Viewing the programme on any topic.
- Deciding to prepare a programme
- Selecting a topic
- Prepare a content outline
- Specification of objective in behavioural terms.
- Specifications (assumptions about learner)
- Entering behaviour. Pre-requisite skills.
- Preparation of pre test
- Terminal behavior. Expected performance of the learner at the end of a course.
- Preparation of post- test. i. e preferably criterion test.

Writing phase: This phase involves 5 steps

1. **Presentation of Materials in Frames:**

- A frame is a small segment of informations which calls forth particular student's response
- The task of the programme is to provide those stimuli necessary to evoke the students' response.
- The acquisition of those response is astep towards the terminal behaviour
- Each frame should contain relatively small segmrnt of content
- Programmer should present only enough materials to elicit the response.

2. **Requires Active Student Response**

- An important part of the frame is the response the student is asked to make
- The response may be overt or covert
- For overt response students write down on answer sheet paper
- For covert response students have to compose response mentally to each blank in the frame before turning the page to the correct answer

3. Provides answers to for Confirmation or correction of student response

- Providing the correct response, with which the student compare his own responses, has been a standard characteristics of programmed instruction.
- When the student discovers that response is correct/incorrect he obtain confirmation

4. Use Prompts to Guide Students' response

- Prompts are case provided in the programme frame to guide the student to the correct response.
- Prompts are supplementary stimuli in that they are added to a frame to make the frame easier but are not sufficient in themselves to produce the response.

5. Provide careful Sequencing of Frames.

- The sequence in or order in which your frames appear depend upon two factors i.e.
  (i)The description and analysis of the behaviour your programme intends to teach
  (ii) The conditions necessary for learning required by the various tasks
- It is even possible to develop frames that engage the students in problem solving and discovery learning. For this programmer need to do following tasks:
  (i) All the basic learning conditions such as discrimination, generalization, contiguity, practice and reinforcement can be embodied in the frame sequence .
  (ii) Frame sequence can also provide for review and testing whenever there are necessary.

Validation phase: It includes following steps

- Try-out and revision
- Individual try-out
- Small group try-out
- Master validation
- Editing, reviewing, revising, and modifying the program for final preparation based on fruits of try-out.

4.5Teaching Machines

The first teaching machine was invented by **Sydney L. Pressey** in the 1920's,

Skinner in the 1950's introduced a concept of "teaching machine" that differed from Pressey's in some ways. “The teaching machine is composed of mainly a program, which is a system of combined teaching and test items that carries the student gradually through the material to be learned. The "machine" is composed by a fill-in-the-blank method on either a workbook or in a computer. If the subject is correct, he/she gets reinforcement and moves on to the next question. If the answer is incorrect, the subject studies the correct answer to increase the chance of getting reinforced next time.” (learning technologies timeline, retrieved 16:22, 16 August 2007 (MEST))

Romiszowski (1997:16) cited by Kristinsdóttir defined the "core" of Skinner's stimulus-response model as “that learning has occurred when a specific response is elicited by specific situation or stimulus with a high degree of probability. The more likely and predictable the response, the more efficient the learning has been. These attempt to shape human behavior by presenting a gradual progression of small units of information and related tasks to the learner. At each stage the learner must actively participate by performing the set task. He is then immediately supplied with feedback in the form of correct answer”

Skinner stated that the student should compose his response on his own, rather than choose it among a large range of possibilities, because the responses should not be recognized but recalled. Moreover, according to Skinner, the machine should present information in a designed sequence of steps. In programmed instruction, the subject is the student itself, the aim is his/her understanding of the material and the reinforcement or punishment refers to satisfaction or disappointment, resulting from the comparison of the student's answers with the E.answers given by the computer.

Teaching machines did not allow students to proceed in their tasks unless they understood the materials. The machines helped students to give the correct answer by "a logical presentation of material" (Skinner on Programmed Instruction) and by *"hinting, prompting, suggesting, and so on, derived from an analysis of verbal behavior"* (Skinner, 1958)

."A teaching machine or auto instructional device is a piece of apparatus designed to be operated by an individual student." This apparatus has following features:1. There is a device for displaying the question or problem on the machine.2. The student in response must do something

overtly about the problem such as writing an answer or pushing a button toindicate answer.3. The student is informed by the machines through some device whether his answer is correct or incorrect and sometimes, why he is right or wrong.

Teaching machines are normally divided into three categories— adjustive, linear and branching. The adjustive machine sdeveloped by Pressey and his co-workers provide knowledge of results to students answering multiple-choice test questions. Methods of giving feedback include lighting a bulk allowing a punch in the correct answer space to penetrate more clearly and having chemically treated paper change colour. The term adjunctive is used because these machines are adjuncts to the main teaching-learning process. They only contain tests and they are used to test and revise material which the student has already encountered elsewhere

4.4 Computer Assisted Instruction

The use of computers in education started in the 1960s. With the advent of convenient microcomputers in the 1970s, computer use in schools has become widespread from primary education through the university level and even in some preschool programs. Instructional computers are basically used in one of two ways: either they provide a straightforward presentation of data or they fill a tutorial role in which the student is tested on comprehension.

If the computer has a tutorial program, the student is asked a question by the computer; the student types in an answer and then gets an immediate response to the answer. If the answer is correct, the student is routed to more challenging problems; if the answer is incorrect, various computer messages will indicate the flaw in procedure, and the program will bypass more complicated questions until the student shows mastery in that area.

computer-assisted instruction CAI; instructional activities that use a computer as the primary vehicle for teaching content or processes rather than one-to-one interaction with a student.

It is a self-learning technique, usually offline/online, involving interaction of the student with programmed instructional materials. Computer-assisted instruction (CAI) is an interactive

instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. CAI uses a combination of text, graphics, sound and video in enhancing the learning process. The computer has many purposes in the classroom, and it can be utilized to help a student in all areas of the curriculum. Hence CAI refers to the use of the computer as a tool to facilitate and improve instruction. CAI programs use tutorials, drill and practice, simulation, and problem solving approaches to present topics, and they test the student's understanding.

computer-assisted instruction (CAI), a program of instructional material presented by means of a computer or computer systems. CAI, as the name suggests, is the use of a computer to provide instruction. The format can be from a simple program to teach typing to a complex system that uses the latest technology to teach new keyhole surgery techniques. CAI draws on knowledge from the fields of learning, cognition, Human ComputerInteraction (HCI) amongst others.

It facilitate instructional procedure with following features

1. Text or multimedia content

2. Multiple-choice questions

3. Problems

4. Immediate feedback

5. Notes on incorrect responses

6. summarizes students' performance

7. Exercises for practice

8. Worksheets and tests.

Types of Computer Assisted Instruction

CAI systems fall into two basic types: tutor or tool (Levy, 1997), although the term CAI often refers to computer tutors. In the tutor classification, the computer has the information to be learnt and controls the learning environment. A CAI tool enhances the teaching process, usually by focusing on one particular learning task and aiming to improve it. Within the tutor classification, there are four modes: drill and practice, tutorials, simulations and games (Gloor, 1990). Drill and practice (also known as "Drill and Kill") is suited to the behaviourist model, with repeated practice on lower-level cognitive skills. Although often frowned upon, it can be useful in certain contexts. The tutorial mode is probably one of the most common ones within CAI. In this mode, the computer presents the information, guides the learner through the system, allows the learner to practise and then assesses the learner.

In simulation mode, the learner works with a simulation of the real world. Simulation is used where it is not practical or feasible to provide the learning in "real-life" (for example, pilot training). In games mode, there is generally a competitive element (e.g. time constraints or a race). The idea is to reinforce knowledge that the learner is assumed to have. While it is often more difficult to develop CAI programs in the simulation and games modes, learners tend to find them entertaining and challenging. Thus CAI can be categorized in following different types.

1. Drill-and-practice Drill and practice provide opportunities or students to repeatedly practice the skills that have previously been presented and that further practice is necessary for mastery.

2. Tutorial. Tutorial activity includes both the presentation of information and its extension into different forms of work, including drill and practice, games and simulation.

3. Games Game software often creates a contest to achieve the highest score and either beat others or beat the computer.

4. Simulation. Simulation software can provide an approximation of reality that does not require the expense of real life or its risks.

5. Discovery. Discovery approach provides a large database of information specific to a course or content area and challenges the learner to analyze, compare, infer and evaluate based on their explorations of the data.

6. Problem Solving This approach helps children develop specific problem solving skills and strategies.

Advantages of CAI

There are many advantages to using computers in educational instruction. They provide one-to-one interaction with a student, as well as an instantaneous response to the answers elicited, and allow students to proceed at their own pace. Computers are particularly useful in subjects that require drill, freeing teacher time from some classroom tasks so that a teacher can devote more time to individual students. A computer program can be used diagnostically, and, once a student's problem has been identified, it can then focus on the problem area. Finally, because of the privacy and individual attention afforded by a computer, some students are relieved of the embarrassment of giving an incorrect answer publicly or of going more slowly through lessons than other classmates.

CAI brings with it several potential benefits as a teaching/learning medium. These include self-paced learning, self-directed learning, the exercising of various senses and the ability to represent content in a variety of media. Thus some of the advantages of CAI are

• One-to-one interaction

• Great motivator

• Freedom to experiment with different options

• Instantaneous response/immediate feedback to the answers elicited

• Self pacing - allow students to proceed at their own pace

• Helps teacher can devote more time to individual students

• Privacy helps the shy and slow learner to learns

• Individual attention

• learn more and more rapidly

• multimedia helps to understand difficult concepts through multi sensory approach

• self directed learning – students can decide when, where, and what to learn

Limitations of CAI

CAI is not without its problems. With self-access programs, learners can be left on their own too much and may feel overwhelmed by the information and resources available. On the other hand, there may be too much direction from the computer if classroom methods are transferred to the computer.Dawson (1997) states that the tendency to use multimedia "gimmicks" should be avoided and that due attention must be paid to current theories on language acquisition. However, this does not mean that multimedia should be avoided. Some researchers (Levy, 1997; Meskill and Mossop, 1997) believe that meaningful multimedia practices are possible and can result in more learning. Malfunctioning equipment can not only result in lost time but also create a negative attitude towards CAI. While the ability to follow links in a Web-based learning system can be of benefit, learners may lose time in navigation. CAI is not yet a mature field. While various CAI models exist, not all CAI programs offer all the benefits of CAI. Sometimes what is theoretically advocated is not implemented in practice (either due to lack of knowledge or technological unfeasibility). Sometimes, the effective or good practices are not easy to identify. Continuing research will help to advance the field of CAI. One interesting research area is that of Web-based Adaptive Educational Systems (WAES), where the system adapts to the learner, providing different levels of information, help and feedback (Brusilovsky, 2000).

There are drawbacks to the implementation of computers in instruction, however. They are generally costly systems to purchase, maintain, and update. There are also fears, whether justified or not, that the use of computers in education decreases the amount of human interaction.

One of the more difficult aspects of instructional computers is the availability and development of software, or computer programs. Courseware can be bought as a fully developed package from a software company, but the program provided this way may not suit the particular needs of the individual class or curriculum. A courseware template may be purchased, which provides a general format for tests and drill instruction, with the individual particulars to be inserted by the individual school system or teacher. The disadvantage to this system is that instruction tends to be boring and repetitive, with tests and questions following the same pattern for every course. Software can be developed in-house, that is, a school, course, or teacher could provide the courseware exactly tailored to its own needs, but this is expensive, time-consuming, and may require more programming expertise than is available. So disadvantages of CAI are

• may feel overwhelmed by the information and resources available

• Over use of multimedia may divert the attention from the content

• Learning becomes too mechanical

• Non availability of good CAI packages

• Lack of infrastructure

•Lack of Competent Human resources

•Difficulty in preparing software

4.7 Researches in E T

The primary focus of its research is upon practical tools that can be applied in teaching Computer Science at university level. Complementary research is addressing conceptual issues concerned with the development of computer-based learning environments for general educational applications.

Current work is concerned with software tools and principles in the areas of peer assessment, plagiarism detection, and automated submission and assessment systems. Other projects include the development of agent-based pedagogic architectures, and the use of learning objects in educational software.

Other research within the group has been directed towards principles for the development of interactive learning environments. A significant theme in this work is that the choice of programming paradigm strongly influences the support that the computer can give to constructionist approaches to learning.

Topics currently being investigated include the following (which include under each topic a complete list of publications).

- Automated Assessment
- Computer Science Education
- Mobile Learning
- Plagiarism Detection
- Supporting Technologies
- While there is much on-going research on new technologies and their effects on teaching and learning, there is little rigorous, large-scale data that makes for solid research, education experts say. The vast majority of the studies available are funded by the very companies and institutions that have created and promoted the technology, raising questions of the research's validity and objectivity. In addition, the kinds of studies that produce meaningful data often take several years to complete—a timeline that lags far behind the fast pace of emerging and evolving technologies.
- For example, it is difficult to pinpoint empirical data to support the case for mobile learning in schools—a trend that educators have been exploring for several years now—let alone data to support even newer technologies such as tablet computers like the iPad. The studies that do look at the effects of mobile technologies on learning are often based on small samples of students involved in short-term pilots, not the kind of large-scale, ongoing samples of students that educators and policymakers would like to see (Education Week, Feb. 23, 2011).

- However, there are a handful of large-scale studies that do point to trends and observations in the education technology field. For example, Project RED, a research initiative linked closely with the One-to-One Institute, which supports one-to-one laptop initiatives in K-12 schools, released a study about successful implementation models of education technology in October 2010. That study found that most of the schools that have integrated laptops and other digital tools into learning are not maximizing the use of those devices in ways that best make use of their potential. The report goes on to outline the critical steps needed to capitalize on that potential (Project RED, 2010).
- A meta-analysis of more than a thousand studies regarding online learning was released by the U.S. Department of Education in 2009, followed by a revised version of the report in September 2010. That study concluded that students in online-only instruction performed modestly better than their face-to-face counterparts, and that students in classes that blended both face-to-face and online elements performed better than those in solely online or face-to-face instruction. However, the researchers cautioned that the vast majority of the studies in the meta-analysis were from students in higher education, and as a result, the conclusions drawn may not be applicable to K-12 education. In fact, a major finding of the meta-study was the severe lack of rigorous research studies regarding online learning in K-12 (U.S. Department of Education, 2010).
- The Speak Up survey, which is conducted annually by Project Tomorrow—a nonprofit research organization—and Blackboard, Inc., surveyed nearly 300,000 students, parents, teachers, and other educators about their views on technology in education. Findings from the 2010 survey found an increased interest from educators in mobile learning, as well as an increase in the number of students who own mobile devices such as smartphones, regardless of economic or demographic differences. The survey also found an increased interest in online learning and blended learning opportunities, as well as electronic textbooks.
- While these studies represent some of the more large-scale research conducted in this field, education advocates emphasize the need for a wider range of well-researched, longitudinal, and ethically sound data on education technology.

- **E-Learning**
- Online learning in many forms is on the rise in schools of all types across the country. Students in many parts of the country now have a long list of choices when it comes to e-learning. The menu of options often includes full-time, for-profit virtual schools; state-sponsored virtual schools; supplemental online learning courses offered by brick-and-mortar schools; and charter schools presenting a hybrid option of digital material coupled with face-to-face instruction.
- The International Association for K-12 Online Learning, or iNACOL, estimates that more than 1.5 million K-12 students were engaged in some form of online or blended learning in the 2009-10 school year. At the end of 2010, supplemental or full-time online learning opportunities were available in at least 48 of 50 states, plus the District of Columbia (iNACOL, 2010).
- Options for full-time virtual schools are growing. Students from kindergarten through high school can seek out online schooling opportunities, which usually include virtual teachers and a combination of synchronous and asynchronous online learning (Education Week, June 15, 2011). These schools are starting to focus more on the issue of socialization for their students and some are incorporating more face-to-face instruction into their array of services to allow for student interaction both online and in person. They're forming clubs, holding proms, and creating school newspapers.
- At the end of 2010, 27 states plus the District of Columbia had full-time online schools serving students statewide, according to iNACOL's report, "A National Primer on K-12 Online Learning."
- But full-time virtual schools also face the reality that for many students with two parents working outside the home such a scenario is not an option. Such students often cannot tap into full-time online schools for that reason, and virtual school providers acknowledge that their version of education works best, particularly in the lower grades, when an adult is present to assist.
- In addition to courses that offer an online instructor, some researchers say students have had the most success with hybrid or blended education. That can mean that students use digital content with a face-to-face instructor, or an online instructor and an in-class teacher may work together to assist students. Hybrid charter schools, which use mostly

digital curriculum with face-to-face support and instruction—sometimes even combined with an online teacher—are gaining a foothold in K-12.

- At the same time, a growing number of students now have access to online courses in their brick-and-mortar schools. Schools are tapping into e-learning for a variety of reasons. Some schools say it saves money and allows them to offer a wider variety of courses, including Advanced Placement classes. Others say it can help with scheduling conflicts when a face-to-face class is provided only at a time when a student already has another obligation. In addition, online courses can provide highly qualified teachers for classes otherwise not offered by a school.
- One of the fastest growing areas of e-learning, and a category that mainstream schools are increasingly turning to, is credit recovery. These online courses allow students to retake classes they haven't passed, but in a new and different format. Many of these credit recovery courses give students a brief evaluation, then permit them to skip concepts they already know to focus on ideas they haven't yet grasped. However, some educators and education experts have questioned the quality and academic rigor of these programs (Education Week, April 28, 2010).
- So where are traditional schools getting these online courses? Some are developing their own, others are purchasing them from for-profit vendors and a growing number are able to tap into state virtual schools or state-led online learning initiatives that currently exist in 38 states. Some schools find it easier to use courses developed by a state-run virtual school, since it is already aligned with their state standards.

- **Mobile Computing**
- Increasing access, growing acceptance, and decreasing cost are all helping to make the use of mobile devices a popular and increasing trend within the world of educational technology.

  While the digital divide between the affluent and disadvantaged still exists, mobile devices appear to have the potential to close it, at least in terms of access.
- According to the "Horizon" report. The report predicts game-based learning will be widely adopted by mainstream classrooms within two to three years (New Media Consortium, 2011).

- Instead of educational software, e.g. Math Blaster or Reader Rabbit, students and teachers are much more likely to incorporate Web-based educational games into classrooms, which are often available for free. The National Science Foundation has played a large role in providing funding for the research and development of Web-based science games such as Crystal Island—a game developed by the IntelliMedia Group at North Carolina State University where students investigate an infectious outbreak—and the River City Project—a multi-user virtual environment for science inquiry created by researchers at Harvard University (Education Week, March 17, 2011; Education Week, April 30, 2008).
- Some educators hope that games and simulations will provide a way for students to picture themselves in career paths they may otherwise would not have chosen, especially in the STEM (science, technology, engineering, and mathematics) subjects, and some argue that games and simulations offer students a way to connect what they are learning in class to (simulated) real-world situations in a safe and low-cost environment (Education Week, March 17, 2011).
- Researchers have also found that games and simulations may help students learn by helping them visualize processes they otherwise could not see, such as the flow of an electron or the construction of a city. Games can also promote higher-order thinking skills, such as collaboration, communication, problem-solving, and teamwork (MIT, 2009; National Academies Press 2011).
- However, creating a healthy marriage of an engaging and entertaining game with educational objectives and goals is a challenging process that has yet to be perfected. To create and design games with the kind of high-resolution graphics and complex situations that children are used to seeing in commercial games takes a large amount of funding and time that educators often do not have. And finding the time and resources to train teachers who may not be familiar with game-based learning is a challenge for most schools.
- Despite these challenges, many educators and researchers are committed to developing educational games and incorporating game-based learning into classrooms across the United States.

- **Social Networking**
- Many schools are no longer debating whether social networking should play a role in education. Instead, that debate has shifted to what social networking tools work best and how to deploy them (Digital Directions, June 16, 2010).
- Some schools are using mainstream social networking tools, like Facebook, for everything from promoting school events to organizing school clubs as well as for more academic purposes related to assignments and class projects.
- But educators wary about security, advertising, information-sharing, and social interaction in such an environment are often seeking out social networks designed specifically for learning instead. These sites, like ePals and eChalk, are more restrictive, often allowing teachers and school officials to limit not only who can join, but who students can talk to and interact with. Some educators also say students seem to take these sites more seriously and treat them with a more academic focus and tone than they would a site they routinely use for socialization with their peers. These sites also often provide safety features that can detect foul language or bullying phrases and alert a teacher (Education Week, June 15, 2011).
- Many educators say the academic benefits of social networking are real. They allow students to work cooperatively on projects in an online environment that feels familiar to students. Teachers often report that a student who does not speak up in class will be more engaged on a social networking site and that these sites allow instructors to extend the school day.

  Educators have also taken to social networks for professional development. The social networking site Ning, for example, has a plethora of group sites organized around teaching a particular subject, like English literature or high school biology. In addition, Twitter has become a force in the professional development arena, with features such as EdChat, weekly one-hour conversations that take place around pre-arranged educational topics (Digital Directions, June 16, 2010).
- Web 2.0 and other technology tools are making it quicker and easier than ever to create digital portfolios of student work—a method of showcasing student progress that experts say increases student engagement; promotes a continuing conversation about learning between teachers, parents, and students; and extends academic lessons beyond school

walls (Education Week, March 17, 2011). New social networking tools to aid this are being developed and updated regularly.

- Wikis and blogs allow students to work collaboratively and share their work with a limited or unlimited number of people. The video phone service Skype is also popular with teachers, particularly for allowing their students to connect with peers in other parts of the country or the world. Other tools, like VoiceThread, which archives and indexes images, videos, text and audio, are popular with all ages of students, including at the elementary level (Education Week, June 16, 2010).

4.8 Future Priorities in E T

The development of the personal computer and the Internet has "enabled man to transcend the barriers of physical distance" (Castro, 2001). People no longer limit their learning to an educational setting such as a school or university. Learning can take place at home or at the office, by online distance learning. The future of technology will enable people to be life-long learners (Thornburg, 1999). Learning will continue into the work place where there is a "need to keep up with current information" (Castro, 2001).

Learners do not have to depend on their memories. They can store information on their personal computers and be able to retrieve it at all times. The concept of knowledge has changed from having information in the brain, to "having access to information about a particular topic and knowing how to use it" (Castro, 2001). Teachers' roles will ultimately change since they will no longer be providers of information. They will be facilitators who concentrate "on the teaching of social skills rather than academic or technical expertise" (Castro, 2001). However, "teacher-mediated classrooms do not foster computer-mediated learning" (Snyder, 2004). "Technology requires changes in the way humans work" (Mulcahy, 2003), yet schools are "adding computers to a traditional, authoritarian, classroom-centered" (Snyder, 2004) setting. It won't work. "As General Electric CEO Jack Welch has said, "If the rate of change inside an institution is less than the rate of change outside, the end is in sight" Welch (as cited in Thornburg, 1999, p.7). Technology is developing at a very fast pace. If education fails to keep up with the current trends, will it keep up with those of the future? This paper will discuss two articles that deal with future trends of educational technology. The articles are: David Thornburg's "Reading the

Future" (1999) and Aureo Castro's "Learning in a Digital Age: Current and Future Trends in Educational Technology" (2001).

Even though David Thornburg's article appeared in 1999, the trends he writes about are still relevant today. David Thornburg lists seven "trends and their consequences" (1999) while Aureo Castro mentions six. The former discusses the "rapid increase in the growth of information, the collapse of the information float, increasingly global marketplace, computers continue to increase in power while dropping in cost, the computer chips continue to follow Moore's Law, bandwidth is becoming free and finally network power continues to obey Metcalfe's Law as future trends that will have "implications for education" (1999). Aureo Castro's future trends include, an increase in web enabled courses, more home schoolers, new roles for teachers, a paradigm shift in primary education, new roles for schools and centralization of curriculum and instructional development" (2001).

According to David Thornburg, because the Internet is "doubling in size every year, [and] the web is doubling in size every 90 days [there is need for] a complete rethinking of education" (1999, p. 4). He suggests the need for "technological fluency [so that students] can sit down at a computer and use it as easily as [they] can pick up and read a book in [their] native language" (1999, p. 5).

Aureo Castro sees "home schooling [and] more web-enabled courses" (2001, p. 2) as future trends in "rethinking education" (Thornburg, 1999, p. 4). He predicts "new roles for teachers [as] facilitators [who will] concentrate on the teaching of social skills rather than [on] academic or technical expertise" (2001, p. 2). Aureo Castro predicts that there will be an increase in online courses "offered through the Internet" (2001, p. 2). He suggests that "the only way to go with the fast increase in population and the physical constraint of the existing colleges and universities [is] in cyberspace" (2002, p. 2). Aureo Castro focuses on the Internet and "distance education" as a trend that will become even more popular in the future. He claims that future "schools will cease to become like a mill where students undergo academic processing but will evolve into becoming community centers where students engage in a variety of activities and projects" (2001, p. 3). According to Aureo Castro, school "curriculum will shift from what used to be extra-curricular activities and become the main curriculum" (2001, p. 3).

David Thornburg focuses on another trend for the future of schools. He worries about "the lack of technologically fluent workers" and getting prepared for jobs that have not been invented yet (1999, p. 5). David Thornburg claims that educators "must create an educational system that prepares students to work in fields that do not even exist" (1999, p. 6). David Thornburg doesn't predict how educators would deal with the educational trends of the future. However, he does claim that once "technologies become commonplace with all students, the tools for lifelong learning will be in place, [adding that] the notion [of] lifelong learning is a survival skill" (1999, p. 6). Future trends cannot be ignored. David Thornburg's final words are harsh. He claims that "Schools that ignore the trends shaping tomorrow will cease to be relevant in the lives of their students and will disappear quickly" (1999, p. 7). The competition is tough. This reflects Jack Welch's statement that "if the rate of change inside an institution is less than the rate of change outside, the end is in sight" (as cited in Thornburg, 1999, p.7).

"Truly global leaders are geo-strategic futurists who gaze across time and make extraordinary things happen" (Feather, n.d). Aureo Castro and David Thornburg are educational futurists who have looked at future trends in technology and their impact on education. Technology can improve student learning and make teachers' work much easier. Educational technology will become "powerful low-cost, off the shelf tools that can make learning more engaging and knowledge more accessible" (Snyder, 2004). Educators "must work in partnership to break down the barriers of time, space, content and form so [learners] can collaborate, communicate, and share ideas" (Mulcahy, 2003).

According to ISTE (International Society for Technology in Education (ISTE),(2010), it released its "Top Ten in '10" list in an effort to provide a framework for policymakers and educators when making decisions about how education funds will be spent--with a particular emphasis on employing technology for school improvement in the context of new and pending federal funding programs tat are demanding education reforms.

"No matter what kind of improvement path a state or school district may follow, the use of technology in learning and teaching is essential for real and lasting change," said ISTE CEO Don Knezek in a statement released this week.

ISTE's recommendations include the following:

1. Establishing technology "as the backbone of school improvement" for student learning, professional development, and administration;
2. Integrating technology to prepare students for careers and keep students engaged;
3. Increasing federal funding support for technology through Enhancing Education Through Technology (EETT);
4. Keeping educators up to date on the latest technologies to help them be more effective in their teaching environments;
5. Increasing support for pre-service education technology programs to help produce more technologically adept teachers;
6. Using technology to "scale improvement" and "accelerate reform";
7. Ensuring universal access to broadband services, which ISTE described as "critical so that students and parents have access to school assignments, grades, announcements and resources";
8. Developing systems and strategies that will help educators use assessment data to improve student learning;
9. Investing in research and development focused on "innovation in teaching and learning"; and
10. Promoting "global digital citizenship" through technology-based, cross-border collaboration.

4.9 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 an 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.

4.10 References

Castro, A. P. (2001). Learning in a digital age: Current and future trends in educational technology. Retrieved April 20, 2004, from http://www.geocities.com/apcastro111/conteduc/edutech.htm

Good, D. G. (1999, January). Future trends affecting education. Retrieved April 20, 2004, from http://www.ecs.org/clearinghouse/13/27/1327.htm

Feather, F. (n.d) Seeing the future. Retrieved April 20, 2004, from http://www.future-trends.com/executive2020_seeing.html

Mulcahy, A. (2003, March 11). A new way to work. ICT World Forum CeBIT. Retrieved April 20, 2004, from http://www.creative010.com/Client/ictwf/press_on_site/speeches/nr_AMulcahy_ICT_World_Forum_2003March11.pdf

Snyder, D. P. (2004, January). A look at the future: Is technology the answer to education's long-term staffing problems? American School Journal. Retrieved April 16, 2004, from http://www.asbj.com/2004/01/0104technologyfocus.html

Thornburg, D. D. (1998, June). Reading the future: Here's what's on hand for technology and education. Electronic School. Retrieved April 20, 2004, from http://www.electronic-school.com/0698f1.html

http://www.nelliemuller.com/Future_Trends_in_Educational_%20Technology.htm

Programmed Learning - Operant Conditioning, Students, and Answers - JRank Articles
http://psychology.jrank.org/pages/505/Programmed-Learning.html#ixzz3bu1Xfec1

https://www.scribd.com/doc/19778483/Programmed-Instruction

http://www.edweek.org/ew/issues/technology-in-education/

UNIT-V

Educational Technology in Formal, Non-formal and Informal Education

UNIT-V

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Structure

5.0 Introduction

Use of technology is in education results in increased effectiveness of the educational process. Use of technology in training results in increased productivity through enhanced human capability. For example, telephone extends our capability to talk and listen over long distance and automobile extends our capability to travel large distance over short period of time.

Overhead projectors extend our capabilities to project a large image of a visual on a screen and slides enable us to capture real-life events and bring them into the classroom.

'Technology' in its broadest terms could include overhead projectors and even pen and paper but, in the context of Learning Technology, it is generally understood that we are talking about technologies that have arrived with the 'Information Revolution' i.e. those associated with computers. E-learning, Educational Technology, Information and Communication Technology, Computer Aided Learning, Computer Aided Assessment, Computer Mediated Communication - these terms and others are bandied about in recent years but what do they mean and why should you invest any time in getting to know more about them? The answer to this question is revealed in this unit. This unit attempt to explore use of emerging technology in the field of formal, informal and distance education.

5.1. Objectives

After studying this unit you will be able to

- Explain the use of educational technology at formal, informal and non formal education.
- List techniques used in Distance and open learning
- Identify emerging trends in Educational Technology
- Explore problems of new technologies
- Describe evaluation in Educational technology
- Give detail functions of resource centers for educational technology

5.2 E.T. in formal, non-formal and Informal Education

(i) **Formal education**

The hierarchically structured, chronologically graded 'education system', running from primary school through the university and including, in addition to general academic studies, a variety of specialized programmes and institutions for full-time technical and professional training.

Application of Educational technology in the Formal Education:

Teachers use technology to display information, create charts, monitor students, to engage students. Students use technology for learning, practicing and expanding what they have learned. In order to be competitive in the world, students must have access to technology.

Function

Technology is used to aid in visual representation in the classroom and can be used as a teaching tool in conjunction with software programs and the Internet. Technology can be used to test student skills and aid in their writing.

Visual Technology Aid

Smart Boards are a technologically-advanced type of chalkboard. Special "markers" are used to write on the boards to display. Interactive media can display website pages and software programs so the class can see the program's applications.

Computer Technology Aid

Many students need more than just the traditional direct teaching method in order to be successful in the classroom. Computer technology allows students to work on programs that enhance learning. Word processing help students with typing and publishing papers. There are a variety of programs that help students practice skills, review material and test specific skills.

Internet Technology Aid

The Internet can provide resources and websites for practicing skills and monitoring student progress. It also has resources for teachers pertaining to student management, lesson plans and other teaching matters.

Considerations

The Internet is a valuable technology tool, but must be used with caution. Student computer use should be closely monitored. Teachers should search for specific websites aimed at students that are safe.

Types of Technology Used in the Classroom

Gone are the days when the teacher stood in the front of the classroom and lectured while students simply took notes. Today the classroom is an interactive world where the teacher as well as the student is engaged with technology. Because today's young people are hooked up and plugged in all of the time, whether it is with text messaging, iPods, social networking websites and more, it is important that teachers find a way to engage them on a technology level. Technology in the classroom is doing just that--keeping students stimulated by using the latest and greatest inventions in computers and digital media.

Projectors

Projectors are a basic way to introduce technology to students in the classroom. The projector is hooked up to the teacher's laptop and projects the screen from the laptop to the white board in the front of the room. This enables students to see a larger version of what is on the laptop screen. A teacher can project a word document and show students' note-taking strategies. The teacher can also show PowerPoint presentations to students using the projector. Students can follow the teacher as he or she goes onto educational websites as well. A projector in the classroom is a remarkable tool in engaging the student with technology.

For different uses, different types of projectors available which are

Video Projectors

Slide Projectors

Overhead Projectors

Opaque Projector (book reader)

LCD / DLP Projectors

SMART Technologies

SMART Technologies are leading the way in classroom interaction between students and teachers using computers. SMART boards are a fantastic way for students to stay engaged in lessons. A SMART board is an interactive white board that allows the teacher to project an image from a laptop to the front of the room. The amazing part is that the teacher can then digitally draw on that image. Graphs and tables are available templates in SMART boards. SMART boards can store lessons and digitally enhance plain templates into customized learning tools. Hundreds of applications are possible with this technology, and students are benefiting immensely from it.

Mimio Boards (Interactive-white boards)

Mimio boards are similar to SMART boards. They are **interactive white boards** that allow the teacher to manipulate computer functions on the white board in the front of the room. Sensors are in place in the board that allows the teacher to use a special pen that acts like a mouse. Teachers maneuver through websites, graphs and other lessons using this technology. Students can even participate by using the board for PowerPoint presentations. This is a fantastic tool in interactive classroom lessons.

Classroom PCs

Some educators are lucky enough to have individual PCs for every student in the class. When every student has his or her own laptop, learning takes on a whole different dynamic. For example, a teacher can allow students to follow along during a writing lesson on Word programs. In addition, students can research and explore on their own. PCs can store a student's work more efficiently than folders. Bulky encyclopedias and dictionaries are unnecessary if every student can access the Internet on his or her own time using a personal computer. A paperless world in the classroom can be organized as well as environmentally friendly. Finally, students become empowered in their education by having their own personal tool to better their academic outcomes.

Technology Education for Teachers

Students have surpassed many teachers in technology use. Because of this, to effectively utilize technology in the classroom, teachers should be properly trained. In addition, it is more academically supported if all teachers use the technology together. It is insufficient for a student to receive an interactive education in only a few classes while in others he or she is receiving outdated instructional strategies. Explicit, interactive instruction is the most useful and engaging way to reach a student and enhance his or her learning potential. Technology can enhance that potential even more.

(ii) Informal education: the truly lifelong process whereby every individual acquires attitudes, values, skills and knowledge from daily experience and the educative influences and resources in his or her environment - from family and neighbours, from work and play, from the market place, the library and the mass media.

Educational technology used for informal education are

- TV
- Radio
- Internet
- Social websites
- Telephone
- Mobile
- Smart phone
- Newspaper, Magazine

(iii) Non-formal education

Any organized educational activity outside the established formal system - whether operating separately or as an important feature of some broader activity - that is intended to serve identifiable learning clienteles and learning objectives.

Application of Educational technology in the Non-Formal Education:

Computer Assisted Learning (CAL)

The term Computer Assisted Learning (CAL) covers a range of computer-based packages, which aim to provide interactive instruction usually in a specific subject area, and many predate the Internet. These can range from sophisticated and expensive commercial packages to applications developed by projects in other educational institutions or national initiatives to simple solutions developed by individuals with no funding or support to tackle a very local problem. The amount of time and money invested in development is high and partly because of the very subject specific nature of the education market as well as the very personalized nature of the teaching process - particularly at FE and HE level - means that commercial success is difficult to achieve and work done in one subject area rarely transfers to others subject areas.

In general, the use of computers in education through CAL has been sporadic a great deal of effort was expended with little general impact. Many of those academics that took part in that earlier crusade are now cynical about the effectiveness of computers in teaching.

There are still good reasons to use CAL rather than Internet based technologies. CAL is run either straight from a CD or floppy disk drive or over a local network so the constraint of the internet - slow download times for multimedia materials may not apply. This, coupled with the fact that CAL technology has been around a bit longer, means that CAL packages have the potential to offer more advanced, interactive, multimedia learning experiences than it is currently reasonable to expect from the Web. This has been changing as Web technologies develop and bandwidths improve but there are currently many things that can only be achieved with CAL rather than the Web and CAL has been an integral part of the curriculum in many departments at Warwick for some time

Introduction to Internet Technologies

The principle difference - 'What has changed?' is that when we talk about interaction in CAL (Computer Aided Learning) packages, we are usually talking about interacting with computer programs. Internet based technologies are more about interaction between people and in our Postmodernist world, we know that learning is largely a social activity and even the most well thought out multimedia interactive materials lack the flexibility of human interaction.

The use of the term Information and Communication Technology (ICT) rather than Information Technology (IT) emphasizes this change. Computers now facilitate communication between people as well as between people and programs or people and data.

Those who were involved in developing CAL packages in earlier decades usually point out that there is nothing new under the sun - which the lessons we are learning today about using the Internet for teaching were learnt before. Others would go further and point out that distance education with print has also covered a lot of the ground before and it is only because most lecturers are only accustomed to the face to face setting that they stumble into well mapped pitfalls when beginning to use internet technologies to teach. All of this is true but it is also true that using the Internet for teaching brings new challenges and necessitates the development of additional teaching skills.

The arrival of the Internet made communication between machines much easier and a number of open protocols and applications were developed to make use of this. Of these, Email was the forerunner and there can be few academics and students that do not have access to this now. Email has its limitations and it was the World Wide Web that really brought the world of networked computers to the general public. The open standards of many of the technologies and the ease with which anyone could publish information encouraged participation by all and we need to remember what is about these technologies that makes them attractive when we try to deploy them for education. However, initially, a relatively small number of University lecturers adopted it for a range of teaching purposes but even fewer did more than post information about their courses or actual lecture notes - usually not modified in any way to take advantage of the strengths of the media such as hypertext.

One of the strengths and principle attractions of the Web is that it can provide authoring access to anybody and this is quite different from the one-way nature of education through CAL or any other media that predated it. The fact that the technology facilitates this does not of course mean that it will take place but then this is true of any educational forum.

While far from needing programming skills, it still takes a certain amount of technophilia to publish a Web page. Creating them is trivial but actually publishing them can be tedious if the institution has not provided a simple means to do so.

This is all about information rather than teaching and learning and it soon becomes obvious to any treading this path that you cannot take the people out of the learning equation entirely. Learning is about interaction and interaction with information alone is not enough.

We can group the **Web technologies** available for education roughly into 3 areas, outlined below:

Digital Learning Resources

Computer Mediated Communication (CMC)

Computer Aided Assessment (CAA)

They tend to be adopted in that order with novice online tutors first placing their lecture notes online 'as is' then restructuring the materials to take better advantage of the media and perhaps augmenting it with resources not possible in print such as video or creating interactive materials.

Digital Resources

This could range from simply placing Word documents on the Web for your students to download and print or making your PowerPoint presentations available after a lecture to creating Web pages that make better use of the media to streamed digital video and simple interactive CAL-like programs.

Computer Mediated Communication (CMC)

CMC can include any means by which individuals and groups use the Internet to 'talk' to each other.CMC can either be synchronous (exchanges take place in 'real time') or asynchronous (messages are posted up at any time, and read and responded to by other users also at times which suit them; in other words, users do not have to be online at the same time, as they do with

synchronous exchanges). Email, mailing lists, Usenet and computer conferencing are all asynchronous, while IRC, Internet telephony and videoconferencing all take place synchronously. All of these types of CMC are now available through the Web i.e. through a standard Web browser.

Which type of CMC you use will depend on what kind of discussion you want to take place? Each has their strengths and weaknesses both in terms of technical constraints and the type of interaction that they encourage.

The main technologies include:

Email - the most popular Internet tool, used to exchange messages between individuals
Mailing lists - which use email to enable communication among groups of people. Individuals send emails to the list email address and receive a copy of all emails sent to that address

Usenet newsgroup - a separate Internet system which allows users to read and contribute to global special-interest 'newsgroups'; the number of newsgroup topics is vast, and subjects range from the very dry to the totally bizarre

Computer conferencing - (sometimes also known as 'discussion boards' or more accurately 'threaded discussion lists') which enables groups of people to hold discussions by reading and posting text messages on a computer system. The advantages over mailing lists are that the messages are archived and the structure of the discussion is also recorded. Computer conferencing is widely used to support learning, and within the educational context is generally what people mean when they talk about 'CMC'

Internet Relay Chat (IRC) - an Internet system which allows users to chat 'live' (in real time) using text or audio Internet telephony, a way of using the Internet as an alternative to the main telephone network; currently in its teething phase, though exciting in that it has the potential to reduce the cost of calling long-distance to that of a local call

Videoconferencing - a means by which small groups of geographically distant people can hold discussions in real time, during which they are able to hear and see each other and share various other types of data. Working with remote experts via distance technologiesword pdf html

Hybrid systems - systems such as Web Board combine threaded discussion lists, IRC and email lists allowing users to switch easily between the two depending on the nature of the discussion. See also Yahoo Groups which is a free online service allowing you to set up a Web based email discussion list with optional forwarding to and replies from your normal email account. It also offers a facility to share documents and images.

Computer Aided Assessment (CAA) The next step is to provide a way for students to assess their own progress and understanding of the material. Without human feedback or very sophisticated artificial intelligence, this usually means some form of objective test delivered as an online quiz. Because it is objective and the possible responses are known, the feedback can also be automated. Students can therefore receive immediate feedback. This use of CAA for self-diagnosis / formative assessment can be quick to set up and if used wisely can provide valuable feedback on the effectiveness of the course to the course tutor.

Integrating Educational Technologies

While each of these technologies has its strengths and weaknesses, it is when they are combined that we start to see their true potential. This was one of the driving forces behind the arrival of Virtual Learning Environments (VLEs) although it has to be said that few of the commercial products make serious efforts to enable this, focusing more on the administration of learning rather than on the learning itself. VLEs attempt to 'wrap up' the three technologies discussed above into online course objects that are password protected. Usually, the sophistication of the tools within a VLE is less than that of an equivalent stand-alone tool; the trade off is in the ease of use, integration of technologies and single point of authentication. Whether you use a VLE or a combination of stand-alone tools really depends on what you are trying to achieve.

Classroom eLearning Technologies

The changes have not all been happening on the Internet or with students sitting in computer labs using CAL packages. Out in the classrooms and lecture theatres, data projectors have being introduced and packages like PowerPoint are being used to present directly through a computer rather than to create and print overhead projector transparencies. The setups have often been unreliable and under supported and there has been a lack of technical confidence among lecturers and it is only within the last few years that this has started to change. Other presentation technologies such as electronic whiteboards, audience feedback systems and videoconferencing facilities are beginning to appear in teaching spaces and these will all require careful thought in integrating them into teaching practice.

5.3 Distance Education, Open Learning System & Educational Technology

Distance education and open learning system provide flexibility to the learners beyond four walls of formal school and college arrangement depending on their own pace, convenience beyond the constraints of time, space, caste, sex, location, religion, community. **Distance education** as a generic term used to define the field [1] or **distance learning** is a mode of delivering education and instruction, often on an individual basis, to students who are not physically present in a traditional setting such as a classroom. Distance learning provides "access to learning when the source of information and the learners are separated by time and distance, or both."[2] Distance education courses that require a physical on-site presence for any reason (excluding taking examinations) may be referred to as hybrid[3] or blended[4] courses of study. Massive open online courses (MOOCs), aimed at large-scale interactive participation and open access via the web or other network technologies, are recent developments in distance education. A number of other terms (distributed learning, e-learning, online learning, etc.) are used roughly synonymously with distance education. However there lies simple difference between distance education and open learning system. Let us first find out the differences.

"Open learning is defined as a student-centered approach to education that removes all barriers to access while providing a high degree of learner autonomy. Distance education refers to a mode of delivering a course of study in which the majority of communication between teachers and students occurs noncontiguously, and the two-way communication between teacher and student necessary for the educational process is technologically mediated. Distance education may or may not be based on open-learning ideals." (Maxwell 1995, 43) Maxwell (1995) regards open

learning and distance education as two non-traditional learning approaches that might provide an option for reaching non-traditional students. He further argues that" Distance education and open learning should be recognized as two distinct concepts. Distance education refers to a mode of delivery with certain characteristics that distinguish it from the campus-based mode of learning. Open learning refers to a philosophy of education providing students with as much choice and control as possible over content and learning strategies. A distance-education institution could be open or closed. An open learning course could be offered on campus or at a distance." (Maxwell 1995, 46)

Atkinson (1996) argues that 'open learning' carries connotations of learning not being closed or blocked off, and so able to be more readily accessed with the opportunity to participate and succeed, while 'flexible learning' carries connotations of learning being more adaptable and versatile, so enhancing opportunities to participate and to be successful. In her opinion, openness can be seen as relating more to an outcome and flexibility to the means of achieving this outcome. The two terms appear to be two sides of the same coin. Flexibility contains dimensions of access (the opportunity to participate), timing and duration, location of study, curriculum factors, and learning support. (Atkinson 1996, 45-46)

Bates (1996) defines distributed learning (DL) as

" a learner-centred approach to education, which integrates a number of technologies to enable opportunities for activities and interaction in both asynchronous and real-time modes. The model is based on blending a choice of appropriate technologies with aspects of campus-based delivery, open learning systems and distance education. The approach gives instructors the flexibility to customize learning environments to meet the needs of diverse student populations, while providing both high quality and cost-effective learning." (Bates 1996, 9)

Bates goes on to contend that although many people use the terms 'distributed learning' and 'distance education' interchangeably or assume that they mean the same thing, this is not the case. He gives an example of university-level courses for fully registered, on-campus students where a substantial part is available on the Web or on CD-ROM. Students can access this material at any time, from the campus or from home, which certainly makes the course more easily accessible.

However, Bates remarks these students have to be 'resident', i.e., available for lectures. In this case, this is distributed learning but not distance learning nor open learning since students have to meet all the stringent entrance requirements to be registered as university students. (Bates 1996, 9-10).

Wylie (1996) summarises eight characteristics of open learning:

Who? (flexible entry provision),

Why? (responsive to learner needs),

What? (learner can negotiate content),

How? (resource-based, alternative strategies),

Where? (home, workplace, study centre),

When? (flexible start, pace, completion times),

How effective? (learner participates in assessment),

Who helps? (variety of advice, support available). (Wylie, 1996, 288)

The tools and software used in DE are often quite the same as in ODL, but there is a shift in emphasis from a more teacher-focused environment towards an open learner-centred and virtual learning environment with a focus on distributed expertise and cognitive tools. However it emphasizes high needs of the students with respect to the concern course in terms of teaching learning resources, teachers, curriculum , evaluation, support system, teaching learning materials etc. This challenging situation can be balanced through educational technology and their tools.

Although the expansion of the Internet blurs the boundaries, distance education technologies are divided into two modes of delivery: synchronous learning and asynchronous learning.

In synchronous learning, all participants are "present" at the same time. In this regard, it resembles traditional classroom teaching methods despite the participants being located

remotely. It requires a timetable to be organized. Web conferencing, videoconferencing, educational television, instructional television are examples of synchronous technology, as are direct-broadcast satellite (DBS), internet radio, live streaming, telephone, and web-based VoIP.[30] Web conferencing software such as Adobe Connect help to facilitate meetings in distance learning courses and usually contain additional interaction tools such as text chat, polls,hand raising, emoticons etc. These tools also support asynchronous participation by students being able to listen to recordings of synchronous sessions. Immersive environments (notably SecondLife) have also been used to enhance participant presence in distance education courses. Another form of synchronous learning that has been entering the classroom over the last couple of years is the use of robot proxies [31] including those that allow sick students to attend classes.[32]

In asynchronous learning, participants access course materials flexibly on their own schedules. Students are not required to be together at the same time. Mail correspondence, which is the oldest form of distance education, is an asynchronous delivery technology, as are message board forums, e-mail, video and audio recordings, print materials, voicemail, and fax.[30]

The two methods can be combined. Many courses offered by both open universities and an increasing number of campus based institutions use periodic sessions of residential or day teaching to supplement the sessions delivered at a distance.[33] This type of mixed distance and campus based education has recently come to called "blended learning" or less often "hybrid learning". Many open universities uses a blend of technologies and a blend of learning modalities (face-to-face, distance, and hybrid) all under the rubric of "distance learning."

Distance learning can also use interactive radio instruction (IRI), interactive audio instruction (IAI), online virtual worlds, digital games, webinars, and webcasts, all of which are referred to as e-Learning.[33] Media psychology and media studies have evolved as research focii in the study of media effects. Each has grown into important academic areas with graduate degree programs now providing professional research, teaching and field staff to help build understanding of the behavioral implications of media. The first MA, PhD and EdD programs in Media Psychology and Media Studies were launched in 2002 by Bernard Luskin at Fielding Graduate University.

Distance education usually has two forms: 1- the learner operates independently and 2- classroom instruction is accompanied by distance learning (California Distance Learning Project (CDLP), 2005). Either way, there is an overlap in terms of both technologies and media. The important elements are technological transmissions and the media applications.

The importance of transmitting instructional materials to distant learner through print, audio and video media, and to deliver messages have always been stressed (Chung, 1991). These technologies and media can be applied in both traditional and modern forms of distance educational systems in higher education in any country. One may define them as follows:

Distant Teacher

Gagne and Reiser (2001) consider any physical matter including teacher that is capable of conveying instruction is considered as an instructional medium and there is no limit on that. Clark and Mayer (2003) confirm this concept and mention any presenter including the teacher or the specialist could be considered as instructional media.

The reason is teacher like any other medium uses audios/sounds (speeches) and videos/pictures (to show processes) (Kim and Means, 2005).

In distance era, the concept of teacher is changing. In virtual courses many of teaching strategies (six modes of instruction: tutoring, lecture, recitation, discussion, laboratory, homework) are employed, so the methods that both concepts of teacher and students controls, must be expanded (Gagne, 1965; as cited in Mollenda, 1999).

In online teaching the speech or verbal communication is largely replaced by text and the new climate can be a scary place for students and instructors who are not familiar with the environment. So, an online successful teacher has these characteristics: being visible (students need to feel that the instructor is attending to them even though there is no face-to-face classroom), being organized (being well prepared and having well-defined assessment strategies, and assessment activities), being compassionate (letting students to communicate directly), being analytical (engaging in the ongoing discussions of content and concepts of the course), and being a leader-by-example (being a best practice model in teaching).

Print Media

Textbooks, study guides, study aids, and newspapers are easy to use, inexpensive, portable, and very familiar to the learner. They can easily be distributed to the learner by mail or package-delivery services. Print media is used in correspondence study, programmed instructions, and in modularized instruction (Feasley, 1982; as cited in Gray, 1988).Print is still in use in distance education (Gujjar & Malik, 2007) specifically in developing countries in which the needed technologies in distance education do not exist or their costs are so high they cause the trend of distance education to still be toward usage of print media (Mitchell, Smith, Louw, Tshesane, Petersen-Waughtal, & du Preez, 2007).

Textbooks, Study Guides, and Study Aids

In a more traditional form of distance education, textbooks, study guides, or study aids are usually used, along with radio and television. For example, in Pakistan, television is the dominant distance education medium and uses printed textbooks as the complementary source (Siraj, 2008). Bangladesh Open University (BOU) also uses textbooks and study guides, audiocassettes, occasional face to face tutorial as tertiary media, along with radio and television (Islam, Rahman, & Rahman, 2006).

Paxton (1999) based on a research on history textbooks focusing found that role of the authorship in historical texts are underscored and the students are largely influenced by the anonymous, authoritative style of writing. Fox (2009) also did an investigation (45 studies) on the role of reader characteristics in processing and learning from informational text. Findings indicate that low level of ability; experience, knowledge, and interest were associated with local-level processing and effortful construction of a text base. In contrast high levels of ability; experience, knowledge, and interest were associated with more globally directed, more effective, more flexible engagement, and leading to better quality mental representations and greater learning.

Adams (2003) researched the effectiveness of the Physics distance education in Kentucky Community and Technical College System's Kentucky University (KYVU). The students were not very highly computer literate and the applied media were websites, emails, chatrooms

(synchronous), discussion (asynchronous), and printed textbooks with a CD. The findings showed that 78% of the students rated the class excellent and successful completion of the class was 63%.

Slavin, Cheung, Groff, and Lake (2009) did an examination on the effectiveness of reading curricula; mixed-method models; computer-assisted instruction; and instructional process programs. Findings indicate that the programs designed to change daily teaching practices have substantially greater research support than those focused on curriculum or technology alone. Also positive achievement effects were found for instructional-process programs, especially for those involving cooperative learning, and for mixed-method programs.

Newspaper

Newspaper is a traditional form of print. Adult Literacy and Basic Skills Unit in London (1992) introduced newspaper as one of the resource materials for its advertisings and informing capabilities. Using the expression 'open-learning' meant flexible and distance learning in Britain.

Newspaper is a very useful resource for adult education students and for creating an individualized instructional program (Aiex, 1988).

Audio Technology and Media

Audio-books, audio-cards, records, audio-cassettes reel-to-reel audiotapes, audio Compact-discs (CDs), telephones, cell phones, audio-texts, and radios are classified under audio media which are described below:

Audio Book

Anadolu University in Turkey, in a project for 300 blind students, is using audio-books in music and drama classes as infrastructure. This has enabled them to study on their own. The courses are provided with the books that are vocalized radio-phonically. The subjects are distinguished from one another by music and the narration is enriched via emphasizing on the important sentences in the topic (Ozgur, & Kiray, 2007).

Audio-Card

Audio-card is a traditional medium which was used a lot and may still be used in some distance education systems. It is a magnetic medium which helps the learner listen to words and repeat them at the same time as she/he sees the words in print. The learner can record her/his own voice and play it back for comparisons and corrections. This medium is a very appropriate medium in teaching foreign languages, mathematics, and especially, if accompanied by pictorial materials, it can add to the quality of the instructional messages(Lewis, Harcleroad, & Brown, 1977; & Bezard, & Bourguignon, 1994).

Record

The record is another traditional medium that is primarily used for sound effects (Burrows & Wood, 1982) and music (Holmberg, 1995 & Wikipedia, Foundation, I., 2010). It is a medium used in teaching, too (Parker, 1986). Reid and Day (1942) mention that radio and records were popular classroom media in 1940s.

Audio-Cassette and Reel-to-Reel Audiotape

Cassette is also a traditional medium which became much more dominant than reel-to-reel (Jamison, Suppes, & Wells, 1974; & Kemp & Smellie, 1989). Recording tapes requires no special skills or equipment, and a teacher can easily record her/his instructions or lectures on tape. Combinations of sound and sight lead to greater learning (Davies, 1971) and, along with print and radio media, audio cassettes are used widely (Perraton, 1993).

In Allama Iqbal Open University in Pakistan (Haque & Batool, 1999) and Bangladesh Open University (Karim, Kama,& Islam, 2001), due to the high costs of modern technologies, radio and television programs, along with audiocassettes, are the dominant media. Research findings of Blok, Oostdam, Otter, & Overmatt (2002) and Baker (1971) show the use of computer and audio CDs had little effectiveness. But the literature show that computer and audio disks were initially used for reading materials to minimize the role of the teacher (Atkinson, 1966; as cited in Blok et al., 2002) and the theme was around the individualization of instruction and individual differences (Baker, 1971).

Audio Compact-Disc (CD)

The newer form of audio media is the audio compact disc which is used as an independent source (Barron, Orwig, Ivers, & Lilavois, 2002) or in conjunction with web or online learning (Notar, Restauri, Wilson, Friery, 2002; & Skylar, 2009). In compact-disc, the audio materials are recorded in a digital format and in play-back mode; sound is heard in a crisp and high-fidelity form (Liu & Chang, 2001).

Compact Disc - Read-Only Memory (CD-ROM)

Compact disc read-only memory (CD-ROM) is a 43/4 inch disc which allows storage of vast amounts of audio and video information and reduces the cost of production, distribution, and storage of printed materials (Bateman, 1986). Hitachi Company has developed on an erasable laser disc with a high capacity and a rapid accessibility (Wedemeyer, 1986). Nowadays many students in the language fields use encyclopedias on CD-ROMs (Tochon, 2009).

Telephone

An answer to the criticism that education via television and computer carries no human communication touches is the application of telephone. It brings learner and teacher together and to some extent fills the gap between them. Telephone is specifically a useful tool for disabled home-bound isolated hearing impaired blind and culturally or socially deprived learner (Stephens & Lazarus, 1989). Because of the mobility of the cell-phone or mobile, it has the flexibility in terms of space and its function is similar to telephone except that the telephone is cheaper.

Poling (1994) explains that at Clemenson University through a modem, any learner at home is able to dial her/his telephone to the computer system on campus. Using this system reduces telephone calls. All learners are given an account on university's main computer and they can be in contact with their professors whenever they wish.

With an electronic blackboard, the sender would send the drawn images or the text and these are converted to audible telephone tones. On the other end of the line, the receiver decoder would convert the signals into presentable screen formats (Schamber, 1988).

Cell-Phone

Telephone is replaced by cell phone as a newer form of overcoming the lack of direct contact between the teachers and learners but it may not have been adapted universally (Baggaley, 2008). In Asia cell phone is being used widely and educators have suggested the design and logistical principles for its use in educational systems (Librero, Ramos, Ranga, Trinona, & Lambert, 2007).

Audio-Text

Audio-text is a kind of technology in which the dissemination of text, particularly electronic word-processing and hypertext with sound and pictures are possible via the computer and telecommunication networks (Levinson, 1989).

Greenberger & Puffer (1989) describe a project using integrated telephone with computerized audio-text responses in which telemedicine is utilized.

Radio

Radio is an appropriate medium to present music performances, speeches, and discussions and the learners can record via radio and can develop their skills in their own location. Radio is specifically useful to teach philosophy, literature, history, language, and linguistics (Feasley, 1982; as cited in Gray, 1988). The classic literature show the film, television, taped lectures, and radio were common in instruction (Jamison, Suppes, & Wells, 1974), especially in 1940s students listened to presidential speeches or openings of the congress, symphony concerts, radio courses, social studies, and or news broadcasts (Reid & Day, 1942). The British Open University has used radio to distribute lectures, drama, poetry, reading, and guest presentations (Gray, 1988). The University of Nairobi has used radio with its correspondence program successfully (Perraton, 1993).

In developing countries, radio is still one of the main media in distance education (Karim et al., 2001; & Reddi & Mishra, 2005).

Video Technology and Media

Television, satellite, direct broadcast satellite, cable television, closed-circuit television, asynchronous and synchronous, Podcast and vodcast, teleconferencing, microwave, interactive Video, teletext, videotext, computer internet, weblogs (blogs), electronic mail, chatroom, and multimedia are all different applied technologies and media in distance education. In a report from the Task Force on Distance Education and Training in Professional Psychology, The American Psychological Association (2002) mentions the application of varieties of media in distance education are: television and computer in their newest forms (satellite, microwave, cable-television, interactive TV, television, direct broadcast satellite, and computer). In addition to television, film was the common medium in instruction (Jamison, Suppes, & Wells, 1974). Video was also mainly used in therapy teacher education, and in teacher training as self-confrontations in which individuals recorded them and played it back for further studying (Fuller & Manning, 1973).

Television and Satellite

Television is a complementary learning medium which interacts with learners and influences the structure of mental representations and cognitive processes of the learners (Kozma, 1991). Television courses can be presented in two basic forms: long range transmission (satellite) and short-range transmission (cable) (Eisele & Eisele, 1990). Television transmission is usually a one-way video or a two-way audio interaction by phone. Film, filmstrip, and video are usually applied as the helping-aids in distant teaching, but because of the easier use of video distribution, video itself can record filmstrips and slide images/still pictures as well as moving pictures (Kemp & Smellie, 1989). In the classic literature of application of video in classroom Fuller and Manning (1973) show that teachers almost at every level and every discipline have been using videotapes of themselves.

In the United States, millions of students enroll in television courses produced by colleges and universities, and satellite television networks are utilized to deliver vocational training to employees throughout the world (California Distance Learning Project (CDLP), 2005).

Satellite is an easy, flexible, relatively inexpensive method of transmitting information from one long distance to another (Gross, 1983 & Board of Governors, State University System of Florida, 2008). It can be used to transmit any information, including voice, data, and video, and can meet rapid expansion of telephone, television, teleconferencing, electronic mail, data communication, and others (Wedemeyer, 1986). In satellite transmission a space station is used to relay signals. A large station dish is placed on the ground to send and receive signals to and from satellites (Oakey, 1983).

Because of the satellite usage in eleven campuses of Tiffin University, its student population has risen by more than 50 percent between the years 2003 and 2008 (Blumenstyk, 2008).

Direct Broadcast Satellite

Direct broadcast satellite is intended to disseminate information directly from the satellite to home receivers, but, at present time, people can receive signals by placing a satellite dish in their backyard or on their specifically designed computers which are utilized as mass storage devices (Meadow, Singleton, & Gordon, 1983).

Pemberton, Fallahkhair, and Masthoff (2005) developed a project in which they showed interactive television(ITV) and direct broadcast have great potentials in teaching second language. They also pointed out that the conjunction of the ITV with cell phone can facilitate the informal language learning.

Cable Television

Cable television is a form of transmitting information in short distances through coaxial cables which disseminate messages in higher fidelity than regular telephone wires. Local television stations, local radio stations, pay cable services, and basic cable services use wire to transmit their signals. The signals are received from broadcast antenna and from satellite by cable facilities and then these signals are placed on buried cables under the ground or strung on telephone poles and passed through houses or a particular neighborhood and then attached to any individual television. People who pay a fee can receive the signals (Gross, 1983).

Cable television has wide application in education. Japan uses it to disseminate instructional materials (Wedemeyer, 1986). One-way video/two-way audio is a system in which television pictures are transmitted to particular sites where people can reply to the broadcasters with a telephone call-in system. Television pictures can also be transmitted in two directions simultaneously through telephone lines so that teachers and students in one place can see and hear teachers and students in other places. This video-conferencing technology increasingly uses the internet and is being used by businesses and university level learners in the California Distance Learning Project (CDLP), (2005).

Closed-Circuit TeleVision

Closed-circuit television (CCTV) is a kind of cable television in which two short distances are connected by cable. It can be a simple two-room hook up or a multi channel state wide interconnection (Burrows & Wood, 1982).

In closed-circuit-television, a limited number of users have access, and it can specifically be appropriate for educational applications, fires, floods, and security systems (Meadow et al., 1983).

Homes have become classrooms for children and adults and new delivery systems have stimulated the development and use of technological applications for teaching and learning. Foremost among them are wireless devices, such as laptop and handheld computers. Video materials are increasingly being delivered by a variety of distribution systems, such as video streaming on the Web, video conferencing, synchronous teaching and learning by closed circuit broadcasting, and satellite television systems (Ely, 2002).

Asynchronous and Synchronous

In asynchronous courses, students have a flexible environment in which self-paced learning is provided by using a variety of tools, such as CD-ROMs, streamed prerecorded audio/video web recordings, and audio podcasts. In synchronous courses, students have online learning environments in which self paced learning is very interactive when using web conferencing products, such as live presentations and live classrooms, Adobe Acrobat Connect Professional,

and other features which help the interactivity. A study compared these two ways of distance educations. The results of this analysis suggest that both types of lectures are effective in delivering online instruction, but they also emphasize on the importance of interactivity and increased level of technology skills (Skylar, 2009).

Another study was done on 180 teacher education students (151 females and 29 males) in asynchronous and synchronous ways. Findings showed, regardless of gender, that two-thirds of the participants preferred asynchronous modes over synchronous ones (Lin & Overbaugh, 2009).

Podcast and Vodcast

Podcast is a form of technology in which audio, video, text, and other media files can be played on a computer or downloaded to MP3 players (Sprague & Pixley, 2008), and it is a popular medium specifically for accessing and assimilating audio information (Copely, 2007).

In a study, the opinions of Aston University students were asked on the (audio) podcasts and the (video) vodcasts and how well they met the requirements and aided learning processes. Overall, students indicated that podcasts and vodcasts were two beneficial resources for learning, particularly when used in conjunction with lecturers' slides and as tools for revisions or assessments (Parson, Reddy, Wood, & Senior, 2009).

Teleconferencing

Teleconferencing is an integration of computer with telecommunication systems in which private companies, corporations, or organizations take the advantages of meeting together through electronic equipments. Teleconferencing is used in its two forms: video conferencing and computer conferencing. In video conferencing, meetings, discussions, and distant classes are held across the country or around the world by using a microphone, television camera, and television equipment. Satellite dishes and time are rented, too (Meadow et al., 1983). Teleconferencing is a form of group-based distance education in which some argue it creates the essence of traditional classroom (Bernard, et al., 2006).

After correspondence courses and audio-conferencing computer based training for individualized instruction, computer conference (Kear, 2001) or electronic forum is the newest form of delivering instructional materials in distance education (Patriarcheas & Xenos, 2009). There is a kind of e-mail which provides electronic mail, search (organizing factors/branching), file transfer, and editorial services. The interchange of messages among scattered users/learners on a particular topic takes place via computer networks (Romiszewski & Haas, 1989).

Videoconferencing enhances collaboration among online learners in an open learning context and encourages collaborative group work (Tomadaki, Quick, & Scott, 2008).

Microwave

Microwave transmission is a wireless form of transmission which is very similar to satellite distribution, but it has some limitations in which signals are sent from one microwave dish to another via line-of-sight. And an earth dish is placed on a high tower to avoid obstructions against received and sent signals (Gross, 1983).

A study was done in Boise State University in Idaho, the U.S.A. to explore the delivery methods. Data showed that the distance courses, enrollments, and credits were more than doubled between the years 1995 and 2000. The delivery methods included telecourses (public television with a limited number of live class meetings), the Knowledge Network (live broadcast to limited distribution sites and homes through wireless or wired cables by microwave), the Higher Education Network (broadcasts through the statewide analog microwave system), the Internet, radio, videoconferencing, and videotape (Belcheir & Atkinson, 2000).

Interactive Video

The optical video disc is an ideal instrument for instructional and reference purposes (Meadow et al., 1983) and combinations of microcomputer and/or cable television provide an interactive visual teaching system in which user/learner has an interaction from home to the broadcasting station. What makes the video displays interactive is the possibility for the learner to address the locations within a computer program, to find needed information to respond to the learner's questions (Eisele & Eisele, 1990).

Interactive videoconferencing (IVC) consists of live, synchronous audio and video communication through a computer or digital phone network among sites in different physical locations. It provides increased learning opportunities, enhanced student motivation, and a two-way instructor-student communication (Dal Bello, Knowlton, & Chaffin, 2007).

Computer

The computer as it is known today was developed in the 1940s. As a result of technological developments over the past years, computers have entered people's lives including film and television (Towhidi, 1986). Computer was introduced to the field of education in 1970s and its first applications were programming and later became the tutor or an aid to teachers (Fouts, 2000).

Computer technology is a suitable tool to present repetitive, drill-type exercises in mathematics or language learning, to create simulations in chemistry and biology laboratories, a source of advice on career decisions, to find relationship between learner's achievement, aptitude, interests, and success in the various fields; and to use the computer itself (to learn applies soft wares (Leffrancois, 1999). Teletex, videotext, e-mail, audiotex, teleconferencing, videodiscs, optical technologies, and interactive video are all applications of computer technology and are considered as an integrated importable of telecommunication technologies. Now, most of the educational systems have great tendencies to use multi-media systems with a mixture of audio and video (Malhotra & Erickson, 1994).

Teletex and Videotex

Teletex and videotex are two systems of transmitting electronic messages of text and graphic materials. There are two types of transmissions: one-way and two-way delivery systems (Wedemayer, 1986).

One-way delivery is known as teletex which is also called broadcast videotext. In this kind of delivery text and graphics are transmitted over the unused portion of television signals. It is a useful service as an encyclopedia, bibliographic search tool, and bulletin board (Gayeskie, 1989). Two-way delivery of text and graphics is known as videotext/videotext, view data, and

interactive videotext (Wedemeyer, 1986) in which the message is sent over telephone lines (Gayeski, 1989).

Electronic Book and Electronic Library

Electronic book or open textbook is an open educational resource (OER) in which printed form is digitized and is available to all distant learners. It is usually supplied by the publisher, along with the printed text (Lo & Dale, 2009; & Matkin, 2009).

An important aspect of a distance education system is having computer networks, multimedia, search engines, electronic libraries, specifically in medical universities (Rokni, 2005 and Tang, 2009).

Internet

Adult basic education in distance learning is changing significantly from a low tech video based instructional system to the interactive internet. Distance education utilizes computer conferencing on the World Wide Web or internet in which teachers and students are able to present text, pictures, audio, and video. File sharing and communications tools like e-mail, chats, and audio and video conferencing are integral to the Internet model. At this time, the British Open University offers a master's degree in the field of "Distance Education" to anyone in the world who has access to the internet. The American Distance Education Consortium (ADEC), the Distance Education Clearinghouse Web sites, and many other sites which can be found on routine internet searches, introduce colleges and universities that offer distant degrees (California Distance Learning Project (CDLP), 2005).

Weblog

World-Wide-Web is complemented by e-mail, instant messaging, chat rooms, internet phones, video-conferencing, net meeting, weblogs (blogs), and many other systems of communication(Perrin, 2006). Students usually use the webs mainly as an information resource and learning support (Kuiper, Volman, & Terwel, 2005). Blogs are designed for directed and orchestrated activities. Learner focused tools and their companions (such as multimedia podcast

and videocast) allow low cost or free personalized publishing and retrieval of content created by anyone. It is easy to use, customized in terms of look and feel, content, target audience, and hyperlinked to other contents on the internet (Cameron & Anderson, 2006).

Web-based multimedia involves more than one modality, or delivery media presentation, and/ or presentation mode (Mandernach, 2009). Many universities provide the video content of some lectures to extend their classes beyond the campus (Marchionini, 2008).

In computer conferences, the conference space or blog space can be used to present all kinds of writings, such as reports, reviews, debates, stories for instructor, or peer comments. Distance education systems utilize weblogs which empower and motivate teachers and make learners reflective and connected practitioners in new knowledge environments (Farmer & Bartlett-Bragg, 2005; as cited Cameron & Anderson, 2006). Blogs are designed for directed and orchestrated activities. Learner focused tools and their companions (such as multimedia podcast and videocast) allow low cost or free personalized publishing and retrieval of content created by anyone. It is easy to use, customized in terms of look and feel, content, target audience, and hyperlinked to other contents on the internet (Cameron & Anderson, 2006).

Electronic Mail

Electronic mail is a form of teletex and is a general name for electronic transmission of message in which the message is digitally transmitted (Meadow et al., 1983).

Poling (1994) explains that e-mail can be effective as a teaching tool for the following issues: "answering directed questions of students, counseling, giving class assignments, making general class announcements, giving occasional quizzes, establishing direct communication with a particular student; posting grades, giving helpful hints about homework or upcoming quizzes, introducing texts, and out ruling excuses for missing class".

Students' advising, registration questions, scheduling, questions on instructional materials, and personal matters can be done through e-mails (El Mansour, 2006). The National Center for Education Statistics (Parsad & Lewis, 2008), in their statistics for the 2006-2007 years, showed that distance education postsecondary degree granting institutions used e-mail as a technology or

medium for instructional deliveries. E-mail is a medium by which students can send messages and questions to their instructors or their fellow classmates (Edvardsson & Oskarsson, 2008). Vooice mail is also an effective tool in learner/instructor conferences and parent/teacher communications (Yoakam, 2001).

Chatroom

Both Web and Chatrooms can function as supporting technologies to compensate for the relative lack of physical space where the teacher and the class members usually come together to discuss courses of distance learning (Knebel, 2001). Twomey (2002) suggests an open chatroom to be used as one of the virtual teacher training center elements, along with other components within the instructional site (components like: extensive list of resources, tools for students' self-evaluation, teacher's evaluation of students, online grade books, and places for announcements). Chatrooms could be used for foreign language learning (Fabos & Young, 1999).

Multimedia

There are different yet similar definitions for multimedia. Doolittle (2002; as cited in Mandernach, 2009) defines it as presentation of instruction that involves more than one delivery media, presentation mode, and/or sensory modality. Schwartz & Beichner (1999), as cited in Mandernach (2009), mention that multimedia is multiple forms of media presentation. Mayer (2001) refers to multimedia as combination of sound, picture, text, and etc together; teacher, board, film, and etc together; and any computerized software that would combine of audio, video stuff. Maddux, Johnson, & Willis (2001), as cited in Mandernach (2009), say multimedia is a text along with at least one of the followings: audio or sophisticated sound, music, video, photographs, 3-D graphics, animation, or high-resolution graphics. The common thing among these definitions is this issue that all multimedia definitions include, but are not limited to, a text in combination with graphics, audio, music, video, and/or animation.

Although some Asian countries may use traditional media in their distance education systems but there are many Asian countries that are using multimedia successfully (Reddi & Mishra, 2005). Ellis (2004) developed a model to test the effectiveness of multimedia in learning on private college students attending one of three classes. The results show that multimedia is an effective

tool in learning. Neo and Neo (2009) also did a research on Malaysian students' perceptions designing a multimedia constructivist-based project. The findings show the multimedia is an effective tool in teaching, learning, critical thinking, and acquiring communication skills.

Arroyo, Beck, Beal, Wing, & Woolf, 2001; Arroyo, Beck, Woolf, Beal, & Schultz, 2000; as cited in Aleven,Stahl, Schworm, Fischer, and Wallace (2003) did a study on the effect of level of interactivity of hints on a multimedia interactive learning environment (ILE). The findings show gender has a role in learning in multimedia social context. The boys benefited more from the shorter and less interactive hints and their self-confidence declined when they worked with the more highly interactive version but the level of interactivity did not affect girls' self-confidence and they did better when supported by more interactive help.

5.10 Emerging trends in Educational Technology

Though several traditional technological tools are used in education system as teaching learning material in this 21st century, with advancement in the field of information communication technology new trends and practices have been coming to this scenario. These new technologies are emerging and flourishing in the society with the continuous research in the fieldd of science and technology which are making teaching learning situation more simple and [leasant. Some of such technologies include technological tools like computer, mobile, tablet, smart phones etc. are as follows:

5.51Video tapes

A relatively wide magnetic tape used to record visual images and associated sound for subsequent playback or broadcasting. **Videotape** is magnetic tape used for storing motion images and usually sound, as opposed to film or random-access digital media. Videotapes are also used for storing scientific or medical data, such as the data produced by an electrocardiogram. In most cases, a helical-scan video head rotates against the moving tape to record the data in two dimensions, because video signals have a very high bandwidth, and static heads would require extremely high tape speeds. Videotape is used in both video tape recorders

(VTRs) or, more commonly and more recently, videocassette recorders (VCRs) and camcorders. Tape is a linear method of storing information, and since nearly all video recordings made nowadays are recorded to random-access media such as a hard disk or flash storage, videotape is expected to gradually lose importance as nonlinear/random-access methods of storing digital video data become more common.

5.52 Radio

Radio is the radiation (wireless transmission) of electromagnetic signals through the atmosphere or free space.[n 1] The biggest use of radio waves is to carry information, such as sound, by systematically changing (modulating) some property of the radiated waves, such as their amplitude, frequency, phase, or pulse width. When radio waves strike an electrical conductor, the oscillating fields induce an alternating current in the conductor. The information in the waves can be extracted and transformed back into its original form.

Radio systems need a transmitter to modulate (change) some property of the energy produced to impress a signal on it, for example using amplitude modulation, angle modulation (which can be frequency modulation or phase modulation). Radio systems also need an antenna to convert electric currents into radio waves, and vice versa. An antenna can be used for both transmitting and receiving. The electrical resonance of tuned circuits in radios allow individual stations to be selected. The electromagnetic wave is intercepted by a tuned receiving antenna. A radio receiver receives its input from an antenna and converts it into a form usable for the consumer, such as sound, pictures, digital data, measurement values, navigational positions, etc.[1] Radio frequencies occupy the range from a 3 kHz to 300 GHz, although commercially important uses of radio use only a small part of this spectrum.[2]

A radio communication system sends signals by radio.[3] The radio equipment involved in communication systems includes a transmitter and a receiver, each having an antenna and appropriate terminal equipment such as a microphone at the transmitter and a loudspeaker at the receiver in the case of a voice-communication system. Radio communication is typically in the form of AM radio or FM Radio transmissions. The broadcast of a single signal, such as a

monophonic audio signal, can be done by straightforward amplitude modulation or frequency modulation.

5.53 TV

It is An electronic broadcast system in which special providers transmit a continuous program of video content to the public or subscribers by way of antenna, cable, or satellite dish, often on multiple channels: A **television** (also **TV**, **telly** or **tube**) is a machine with a screen. Televisions receive broadcast signals and turn them into pictures and sound. The word "television" comes from the words *tele* (Greek for *far away*) and *vision* (*seeing*).Television has been given considerable importance in many countries as a source and a tool of teaching. The success stories of using television for education in many countries has negated the concept that television is basically on entertainment oriented medium and it is hostile to thoughts. Television is adaptable and can follow different approaches when used in the different educational situations. The medium is used for formal, non-formal and informal education. To support formal education, television usually function as supportive and reinforcement tool. Television can be attached with school curriculum and time tables. When systematically organized it takes the form of school broadcast. In non-formal education, television has a more specific role to play. When used as a part of multi-media communication tool, television can directly or indirectly teach the subject matter.

Importance of television to communicate information, idea, skills and attitudes has been affirmed by researches. You should attempt to study various reports published on educational television in different countries in different situations. In the words of Director BBC "next to home and school I believer television to have a more profound influence on human race then any other medium of communication."

If media is to work as an effective teaching tool then certainly it is helping hand towards, achieving the aim and objectives of education. Media is an agent of boost cultural economic and social development activity. Television, as an important mass medium disseminates education through formal and information methods.

Television also continues to benefit the masses by making them conscious of the environment, rights, duties and privilege. It is a source of teaching etiquettes, language skills, hobbies, social relations and religious believes.

Role of television is neither fixed nor easily tangible and measurable. The role is directly related to the question of how the planners are serious and determined to use television. The role could either be enormous or, on the contrary very meager depending upon the specific tasks and available resources. Generally television can help to achieve the following objectives:

a) Social quality in education
b) Enhance quality in education
c) Reduce dependency on verbal teaching and teachers
d) Provide flexibility of time and space in learning.
e) Stimulates learning
f) Provide mass education opportunities.

As far the impact of education television it should rather be studied in more narrow and specific areas. In the world of scram; TV is more effective in teaching mathematic, science and social studies. Where as history, humanities, and literature has not benefited from this medium the same degree.

The impact of television on macro level should be studied in three areas namely;

i) Teacher's Competencies
ii) Student's Competencies
iii) Effects on general viewers

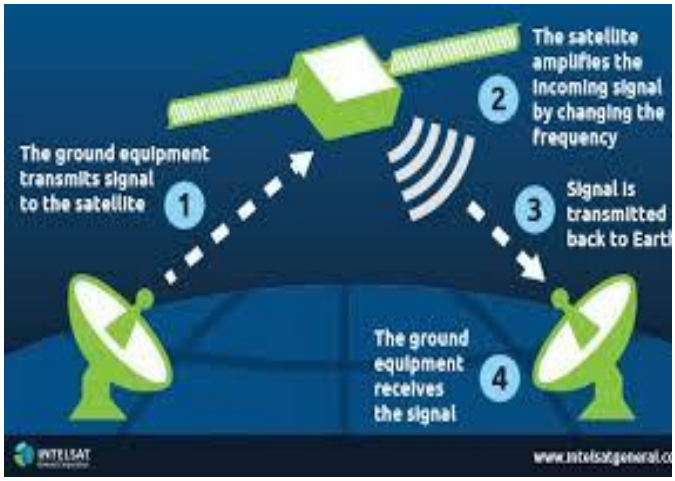
Television programs may be transmitted either "live" or from a recording. The principle means of recording television programs for future use is videotape recording. When a television program is broadcast, the varying electrical signals are then amplified and used to modulate a carrier wave (see modulation); the modulated carrier is usually fed to an antenna, where it is converted to electromagnetic waves and broadcast over a large region. The waves are sensed by antennas connected to television receivers. The range of waves suitable for radio and television transmission is divided into channels, which are assigned to broadcast companies or services.

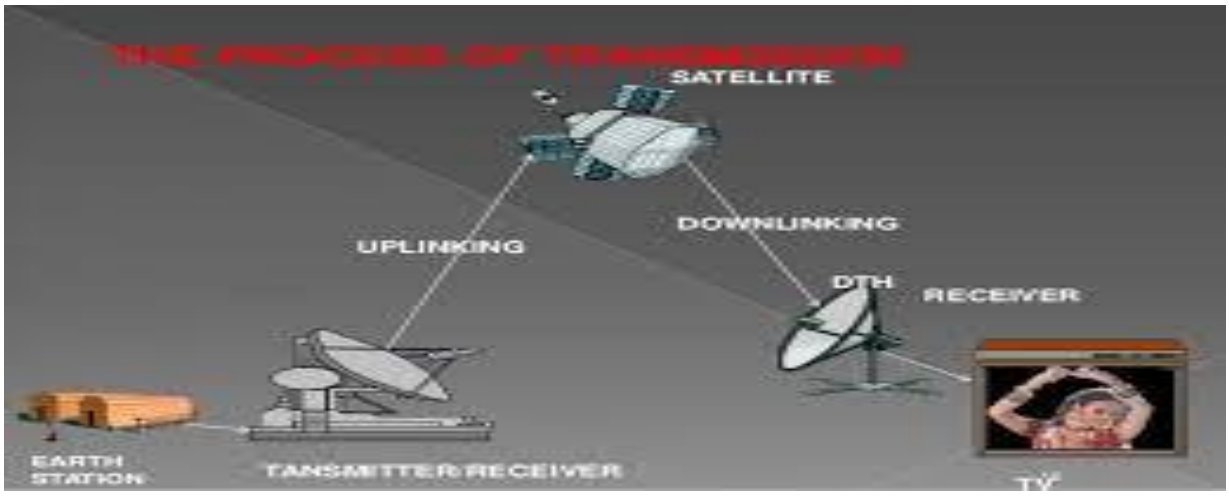
Elements of Broadcast Television

There are a several major parts that are required in order to receive television broadcasts. They include an image source, a sound source, a transmitter, a receiver, a display device, and a sound device.

- ***Image Source***

The image source can be defined as the program. It can be a movie, TV show, news program, etc. The image source is just the source's video and does not include the sound. The image source is usually recorded on camera or flying spot scanner.





- **Sound Source:**

  Once the image source is obtained in the form of movie, sound it is needed to complete a medium. The sound source is the TV programme's audio signal whether coming from movie, TV show, news programme. It cab n come in the mono, stereo or even digitally processed surround sound.

- ***Transmitter***

A transmitter is what sends both audio and video signals over the air waves. Transmitters usually transmit more than one signal (TV channel) at a time. A transmitter modulates both picture and sound into one signal then sends this transmission over a wide range for a receiver (TV set) to receive.

- ***Receiver***

A receiver (TV set) receives the transmitted signals (TV programs) and turns radio waves, which include audio and video signals, into useful signals that can be processed into an image and sound.

- ***Display Device***

This is either a TV set or monitor. A display device has the technology to turn the electrical signals received into visible light. On a standard TV set, this includes the CRT (Cathode Ray Tube) technology.

- ***Sound Device***

The sound devices are usually speakers that are either built into the TV set or that accompany the TV set and turn electrical signals into sound waves to play audio along with the video images.

- ***Broadcast Television Signals***

Broadcast Television Signals are video and sound signals that are transmitted over the air. Anyone using a television set that has a receiver and an antenna can pick them up for free. Antennas are used to grab as much signal as possible and to sometimes amplify the signal.

All TV sets have the ability to switch the receiver's tuner to pick up specific channels. Each channel is transmitted on its own frequency, which the TV set can tune into and receive.

Broadcast TV vs. Satellite TV and Cable TV

There are three main ways to receive TV programming, one is through broadcast television and the other two are through satellite and cable TV.

- **Broadcast TV**

Broadcast TV is when audio and video signals are transmitted over the air waves from a ground based transmitter. These signals are usually picked up for free and are on specific frequency spectra.

- **Satellite TV**

Satellite TV is usually a digital TV signal that is broadcast from a satellite orbiting the earth. They are usually pay services that require special equipment to receive programming and operate on special frequencies.

Cable TV

Cable TV is a pay TV service that sends out signals not over the air, but through cable that runs from the cable company to the viewer's home. Many cable types, from copper to fiber optic cables, are used. The signal can be analog or digital

5.54 Tele-conferencing

Teleconferencing means meeting through a telecommunications medium. It is a generic term for linking people between two or more locations by electronics. There are at least six types of teleconferencing: audio, audiographic, computer, video, business television (BTV), and distance education. The methods used differ in the technology, but common factors contribute to the shared definition of teleconferencing:

- Use a telecommunications channel
- Link people at multiple locations
- Interactive to provide two-way communications
- Dynamic to require users' active participation

5.541Interactive Technologies

The new systems have varying degrees of interactivity - the capability to talk back to the user. They are enabling and satellites, computers, teletext, viewdata, cassettes, cable, and videodiscs all fit the same emerging pattern. They provide ways for individuals to step out of the mass audiences and take an active role in the process by which information is transmitted. The new technologies are de-massified so that a special message can be exchanged with each individual in a large audience. They are the opposite o mass media and shift control to the user.

Many are asynchronous and can send or receive a message at a time convenient for individuals without being in communication at the same time. This overcomes time as a variable affecting communication. A video, data and voice delivery system reduces travel costs. When the material is retrieved and saved to a video tape or disc, the material can be used at anytime or anyplace.

As more interactive technologies emerge, the value of being an independent learner will increase. Research shows that learning from new technologies is as effective as traditional methods. Large groups are cost-effective and everyone gets the same information.

5.542 Types of Teleconferences

Audio Teleconference: Voice-only; sometimes called conference calling. Interactively links people in remote locations via telephone lines. Audio bridges tie all lines together. Meetings can be conducted via audio conference. Preplanning is necessary which includes naming a chair, setting an agenda, and providing printed materials to participants ahead of time so that they can be reviewed.

Distance learning can be conducted by audio conference. In fact, it is one of the most underutilized, yet cost effective methods available to education. Instructors should receive training on how to best utilize audio conferences to augment other forms of distance learning.

Audiographics Teleconference: Uses narrowband telecommunications channels to transmit visual information such as graphics, alpha-numerics, documents, and video pictures as an adjunct to voice communication. Other terms are desk-top computer conferencing and enhanced audio. Devices include electronic tablets/boards, freeze-frame video terminals, integrated graphics systems (as part of personal computers), Fax, remote-access microfiche and slide projectors, optical graphic scanners, and voice/data terminals.

Audiographics can be used for meetings and distance learning.

Computer Teleconference: Uses telephone lines to connect two or more computers and modems. Anything that can be done on a computer can be sent over the lines. It can be synchronous or asynchronous. An example of an asychronous mode is electronic mail. Using electronic mail (E-Mail), memos, reports, updates, newsletters can be sent to anyone on the local area network (LAN) or wide area network (WAN). Items generated on computer which are normally printed and then sent by facsimile can be sent by E-Mail.

Computer conferencing is an emerging area for distance education. Some institutions offer credit programs completely by computer. Students receive texts and workbooks via mail. Through common files assigned to a class which each student can assess, teachers upload syllabi, lectures, grades and remarks. Students download these files, compose their assignment and remarks off-line, then upload them to the common files.

Students and instructors are usually required to log on for a prescribed number of days during the week. Interaction is a large component of the students' grades.

Through computers, faculty, students and administrators have easy access to one another as well as access to database resources provided through libraries. The academic resources of libraries and special resources can be accessed such as OCLC, ERIC, and Internet.

Administrators can access student files, retrieve institutional information from central repositories such as district or system offices, government agencies, or communicate with one another. Other resources can be created such as updates on state or federal legislation.

Video Teleconference: Combines audio and video to provide voice communications and video images. Can be one-way video/two-way audio, or two-way video/two-way audio. It can display anything that can be captured by a TV camera. The advantage is the capability to display moving images. In two-way audio/video systems, a common application is to show people which creates a social presence that resembles face-to-face meetings and classes and enables participants to see the facial expressions and physical demeanor of participants at remote sites. Graphics are used to enhance understanding. There are three basic systems: freeze frame, compressed, and full-motion video.

Video conferencing is an effective way to use one teacher who teaches to a number of sites. It is very cost effective for classes which may have a small number of students enrolled at each site. In many cases, video conferencing enables the institution or a group of institutions to provide courses which would be canceled due to low enrollment or which could not be supported otherwise because of the cost of providing an instructor in an unusual subject area. Rural areas benefit particularly from classes provided through video conferencing when they work with a larger metropolitan institution that has full-time faculty.

Through teleconferencing, institutions are able to serve all students equitably.

Why Use a Teleconference?

Videoconferencing increases efficiency and results in a more profitable use of limited resources. It is a very personal medium for human issues where face-to-face communications are necessary. When you can see and hear the person you are talking to on a television monitor, they respond as though you were in the same room together. It is an effective alternative to travel which can easily add up to weeks of non-productive time each year. With videoconferencing, you never have to leave the office. Documents are available, and experts can be on hand. A crisis that might take on major proportions if you are out of town, can be handled because you're on the job. Videoconferencing maximizes efficiency because it provides a way to meet with several groups in different locations, at the same time.

As the limited resource of funding has decreased, limited resources now include instructors, parking spaces and buildings. Students now include time as a limited resources. Teleconferencing enables institutions to share facilities and instructors which will increase our ability to serve students.

Move Information - Not People

Electronic delivery is more efficient than physically moving people to a site, whether it is a faculty member or administrator.

Save Time: Content presented by one or many sources is received in many places simultaneously and instantly. Travel is reduced resulting in more productive time. Communication is improved and meetings are more efficient. It adds a competitive edge that face-to-face meetings do not.

Lower Costs: Costs (travel, meals, lodging) are reduced by keeping employees in the office, speeding up product development cycles, improving performance through frequent meetings with timely information.

Accessible: Through any origination site in the world. Larger Audiences: More people can attend. The larger the audience, the lower the cost per person.

Larger Audiences: More people can attend. The larger the audience, the lower cost per person.

Adaptable: Useful for business, associations, hospitals, and institutions to discuss, inform, train, educate or present.

Flexible: With a remote receive or transmit truck, a transmit or receive site can be located anywhere.

Security: Signals can be encrypted (scrambled) when it is necessary. Encryption prevents outside viewers.

Unity: Provides a shared sense of identity. People feel more a part of the group...more often. Individuals or groups at multiple locations can be linked frequently.

Timely: For time-critical information, sites can be linked quickly. An audio or point-to-point teleconference can be convened in three minutes.

Interactive: Dynamic; requires the user's active participation. It enhances personal communication. When used well for learning, the interactivity will enhance the learning and the teaching experience.

5.55 CCTV

Closed-circuit television (**CCTV**), also known as **video surveillance**, is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. It differs from broadcast television in that the signal is not openly transmitted, though it may employ point to point (P2P), point to multipoint, or mesh wireless links. CCTV can serve multiple purposes when utilized by the educational sector. First and foremost, CCTV can provide security services for educational buildings, guarding the technology and premises from outsiders who have intentions to harm the children, steal costly technology or vandalize school property. CCTV can also protect from threats inside the school, such as proving or disproving accusations of sexual abuse, bullying from other children, or theft from teachers or staff. More recently, CCTV has been put to work as a direct educational tool, being used as a vessel to funnel distance learning to remote areas or to non-traditional learners. It is often a significant tool for teacher training process.

5.56 CAI

"Computer-assisted instruction" (CAI) refers to instruction or remediation presented on a computer. Many educational computer programs are available online and from computer stores and textbook companies. They enhance teacher instruction in several ways.

Computer programs are interactive and can illustrate a concept through attractive animation, sound, and demonstration. They allow students to progress at their own pace and work individually or problem solve in a group. Computers provide immediate feedback, letting students know whether their answer is correct. If the answer is not correct, the program shows students how to correctly answer the question. Computers offer a different type of activity and a change of pace from teacher-led or group instruction.

Computer-assisted instruction improves instruction for students with disabilities because students receive immediate feedback and do not continue to practice the wrong skills. Computers capture the students' attention because the programs are interactive and engage the students' spirit of competitiveness to increase their scores. Also, computer-assisted instruction moves at the students' pace and usually does not move ahead until they have mastered the skill. Programs provide differentiated lessons to challenge students who are at risk, average, or gifted.*

5.57 INSAT-

INSAT or the ***Indian National Satellite System*** is a series of multipurpose geo-stationary satellites launched by ISRO to satisfy the telecommunications, broadcasting, meteorology, and search and rescue operations. Commissioned in 1983, INSAT is the largest domestic communication system in the Asia Pacific Region. It is a joint venture of the Department of Space, Department of Telecommunications, India Meteorological Department, All India Radio and Doordarshan. The overall coordination and management of INSAT system rests with the Secretary-level INSAT Coordination Committee.

INSAT satellites provide transponders in various bands (C, S, Extended C and K_u) to serve the television and communication needs of India. Some of the satellites also have the Very High Resolution Radiometer (VHRR), CCD cameras for metrological imaging. The satellites also

incorporate transponder(s) for receiving distress alert signals for search and rescue missions in the South Asian and Indian Ocean Region, as ISRO is a member of the Cospas-Sarsat programme.

The Indian National Satellite (INSAT) system was commissioned with the launch of INSAT-1B in August 1983 (INSAT-1A, the first satellite was launched in April 1982 but could not fulfil the mission). INSAT system ushered in a revolution in India's television and radio broadcasting, telecommunications and meteorological sectors. It enabled the rapid expansion of TV and modern telecommunication facilities to even the remote areas and off-shore islands. Together, the system provides transponders in C, Extended C and K_u bands for a variety of communication services. Some of the INSATs also carry instruments for meteorological observation and data relay for providing meteorological services. KALPANA-1 is an exclusive meteorological satellite. The satellites are monitored and controlled by Master Control Facilities that exist in Hassan and Bhopal. **INSAT 3E** is a defunct communication satellite built by Indian Space Research Organisation. It was launched on September 28, 2003 from the European Space Agency's spaceport in French Guiana on board the Ariane rocket. The satellite had a launch mass of 2750 kilograms. It is the 4th satellite launched in the INSAT-3 series of ISRO.It was designed for providing high-speed communication, Television, VSAT & Tele-education services and was an important landmark in Indian Space Programme. the government of India developed a plan of operation for the utilization of television and other facilities under the INSAT series and with the installation of high power and low power transmitters (HPTs and LPTs) in the country.

The INSAT for education project began in October 1983 with the transmission of educational television programmes for children in the age group 5- 11 years. This coverage was initially meant for clusters of villages in six states: Andhra Pradesh, Bihar, Uttar Pradesh, which came to be known as the INSAT states.

In 1986 and 1987, the transmission was increased to cover the entire six states and all the Hindi speaking states of the country with the help of INSAT-1B, HPTs and LPTs. At present ETV programmes are telecast in several languages including Hindi, Gujarati, Marathi, Oriya and Telugu.

These ETV programmes are relayed by all HPTs and LPTs in the six INSAT states and other Hindi speaking states. These programmes reach more than 500 million people of our population.

The UGC countrywide classroom offers enrichment programmes which are not based or restricted to the syllabus. Instead, it seeks to provide new insights, to bring in new findings and to take students on vicarious tours of places and laboratories that are not within their reach.

Inter-relatedness of various disciplines and of development problems are stressed. It attempts to overcome the obsolescence of the syllabus and presents the latest advances in all fields, especially the newly emerging ones.

The programmes include applied science and social science, Indian culture, general knowledge and career guidance. Thus, enrichment programme is meant to link academic education to the real world.

The INSAT system provides a comprehensive and integrated range of services. These include domestic long distance communications, meteorological Earth observation and data relay, direct broadcast television, national radio networking, television program distribution, standard time and frequency signal dissemination services, satellite news and facsimile dissemination, mobile satellite service, satellite aided search and rescue service and cyclone warning dissemination service.

Not all services are available on all satellites, but these capabilities are all available through the combined system. At present, several INSAT series satellite continues to perform well in orbit providing these vital services.

1. Broadcasting:

INSAT has been a major catalyst for the rapid expansion of Television coverage in India. Radio Networking through INSAT provides a reliable high fidelity programme channels for national as well as regional networking.

3. Telecommunication:

INSAT system continues to support various communication services in the country.

4. Weather Forecasting:

Besides revolutionizing the telecommunication and TV broadcast scenario in our country Indian National Satellite System (INSAT) has improved the weather forecasting and is providing advance warning on disasters.

5. Disaster Warning:

INSAT is also providing disaster warning to the receivers installed along the cyclone-prone East coast of the country. These disaster-warning systems have enabled evacuation of thousands of people well in advance of impending cyclones.

6. Education:

The INSAT network is extensively being used for educational purpose such as countrywide classrooms conducted by the University Grants Commission for two hours every day primarily meant for the university and college students, educational television programmes broadcast in the local languages for the benefit of the rural population and curriculum-based lectures broadcast by the Indira Gandhi National Open University (IGNOU).

7. Telemedicine:

Telemedicine is a recent application of the satellite communications that makes specialised medical facility available to the remote areas of the country. The expert consultancy could be obtained for the patients in remote areas from specialists in specialty hospitals in cities.

7. Additional emerging Technologies: Some of the additional technologies are

- **iPads**: iPads have replaced Kindles as the preferred hand-held gadget, but it's not just about novelty. iPads have proven to be effective learning devices that allow students to interact with their lessons and teachers to constantly stream and direct students toward

constantly updated information. As teacher-designed applications become the norm, iPad (and other Apple devices) will also foster customized learning so that educators can tailor their lessons to their class' performance and potential. Other benefits of the iPad in elementary education: more social interaction during learning, better mobility, focused learning, and special needs accommodation.

- **Ebooks**: Even some libraries are starting to offer ebooks alongside the card catalogs, and Arnold Schwarzenegger recently pledged to use more ebooks to combat the loss in funding for California schools. Textbooks will be easily updated in electronic form, which is much cheaper for school districts, and some ebooks and digital texts can be accessed as apps for iPhones and other devices.
- **Innovative funding programs**: Despite harsh budget cuts across the country, parents and teachers are fighting to keep technology a stable, progressive learning tool in schools. One middle school in Pollock Pines, CA, has organized a task force to find alternative sources of funding for technology programs and supplies, and other schools are being inspired to create innovative funding programs, too. As the trend continues, schools will be less reliant on governments and public funds, and can benefit from other sources of technology "income." This system could lead to unfair and unbalanced budgets, if lower-income schools can't pull together the same resources.
- **Training teachers to become online educators**: High schoolers are experimenting with online learning, and the trend is becoming so popular, it's starting to filter down to elementary and middle schools, too. As a result, teachers need training in online education so that they can transfer their classroom management skills to online environments, effectively communicating lessons and evaluating student performance.
- **Interactive whiteboards**: Teachers with projection screens (or just a clean whiteboard) can connect their computer so that their desktop is displayed in front of the classroom, like a chalkboard. When teachers visit interactive websites or software programs — particularly ones with touch-key or touch-based features, students can all at once interact with the lesson or game, without needing their own computers.
- **Virtual reality**: Virtual reality isn't just an after-school game for kids who like computers. SecondLife and other VR sites and platforms offer immense learning opportunities in real-life skills, and can even introduce students to other classrooms who

"play" in the same space. This North Carolina elementary class wanted to experiment with math, science and art lessons through virtual reality, and they actually designed their own virtual labs.S tudents can work in virtual laboratory, can play on line educational games or participate in simulations.

- **Blackboard and online communities**: Online education platforms like Blackboard have been used by college professors for years, but they're now being used more frequently in elementary and secondary classrooms, too. These communities allow for connection between teachers, parents and students, during the school day and after hours. Grades, assignments, supplemental readings, games, chats and all types of resources can be shared easily this way, fueling multi-way communication and collaboration.
- **Mobile technology**: These days, iPods, cell phones and smart phones, iPads, and other mobile devices are quickly becoming sought-after educational tools, even in elementary classrooms. They can be used for research, one-to-one computing, e-mailing assignments, sharing information, taking pictures for projects and research, and using drawing tools, as Keller, TX, teacher Matt Cook has demonstrated. He's worked with Verizon Wireless and other corporate sponsors to give phones to his fifth graders.
- **Podcasting**: Podcasts are great tools for elementary teachers, because they're free and give students instant access to multimedia learning experiences from all over the world. From current events to language lessons with pronunciation assistance to science research to literature discussions to interviews with industry experts, podcasts enrich lessons in ways that help students understand the real-life implications of what they're learning. A great alternative to showing slideshows and even movies, podcasts can stir up class discussion and even inspire classrooms to create their own podcast.
- **Moodle**: Moodle is gaining traction in classrooms at all levels for its streamlined organization features. Teachers and administrators can easily communicate and design courses, and students can manage their own e-mail accounts, assignments, and more. Other great features include multimedia playlists and capabilities, RSS feeds, grading and assignment rubrics, ePortfolios, and personalized certificates.

5.11 Problems of new technologies.

Technology has been used in most schools?), but it still has some hiccups. We weigh in on some of the most problematic issues facing the edtech world today.

- ***Cheating:*** Students are so quick to turn to the Internet to answer questions that some believe critical thinking has gone down the tube. Spelling is no longer something tested if everything is autocorrected and spell checked. This may be a larger issue of technology on our memory and brain-strength, but if we are using the Internet in schools, then kids are being taught to use Google to answer all their questions and to essentially, copy and paste their knowledge. Education needs to figure out how to use technology in a way that doesn't replace knowledge, but reinforces it.
- ***Difficulty in Handling and Managing ET on the part of Students:*** When using the computer and all its glitches to create a project that requires hours of work, it sometimes gets erased, doesn't transfer over correctly, doesn't save, or for one human error or another is gone. Many technology rookies have been in this position and curse at the computer that has stolen hours. Some students struggle simply to complete work that it seems unfair to put obstacles in their way, especially when some students may not have programs or the technology at home to become familiar with it. The problem with technology glitches is also seen with online textbooks. Some students have issues accessing textbooks at home if they don't have a large enough bandwidth. Other access problems to online materials can delay students and put them behind in class.

- ***Technologically Illiterate Teacher:*** Some teachers do not utilize the technology they've been given. They have been teaching for years and don't want to incorporate something new into their time-tested lesson plans. Some schools are pushing instructors to incorporate technology into their syllabi and when it is poorly taught the technology is not used at optimal level. Any teacher given high-tech programs and expected to teach it in the classroom deserves proper training, and sometimes it isn't provided.

- ***Distraction by Social sites and other websites:*** Social sites like Facebook, Twitter, Instagram, Pinterest, YouTube, etcetera create problems. Putting a computer in front of a high school student and expecting them not to go on Facebook or any other distracting non-school related site is kind of a joke. And it isn't just the younger students that are in danger of losing focus; even graduate students can hardly help themselves to online distractions in the classroom. When keeping students excited and focused on the lesson at hand is one of the hardest task a teacher faces, a computer can be one of the most detrimental things to that student's learning.

- ***Poor Instructional Design:*** The major problem in educational technology is poor instructional design. The idea that technology can save education may have some truth in it, but it may be problematic to treat all our educational issues with technology. In 2007, Education Week reported on a major federal study that found, "no difference in academic achievement between students who used the technology in their classrooms and youngsters who used other methods." If students aren't proficient in their studies to begin with and technology is used incorrectly, a whole mess of problems could arise. Technology needs to be planned out into schools in a very precise manner in order for it to be effective, and to cover all of education's problems

5.7 Evaluation & Educational Technology

Educational technology is an emerging trend that has been growing rapidly in the field of school and college education. Many new researches have been supplementing new techniques toi this field for flourishing this new field. Howerver it is really required to explore how far these technological tools are able to achieve the instructional objectives properly. For this there is a need to evaluate instructional technology with proper criteria and strategy. Evaluation *uses the information from monitoring* to analyze the process, programs and projects to determine if there

are *opportunities for changes* to the strategy, programs and projects. Evaluation, like monitoring, should promote learning.

Evaluation of teaching/learning software consists of two types: formative and summative.

Formative evaluation is done in a continuous process during the development of educational media courseware. Formative evaluation helps in taking decision regarding the inputs in the educational technology material development.

Summative Evaluation is another type of evaluation in educational technology. After the completion of the development of educational technology media in software or hardware form , the courseware is released for use. The actual user themn make suggestions and these suggestions form the basis of summative evaluation.

Rubrics can also be used to evaluate software and technology based upon specified criteria (e.g., cost effectiveness, age appropriateness, curricular relevance, etc.). The rubrics presented for evaluating software and Web sites are very useful and are appropriate for both you and your students to use. As noted, most schools and/or districts have a group of people who evaluate software prior to making a purchase. Teachers also need to evaluate software before attempting to integrate it in the curriculum. It is always important to evaluate software for content and age appropriateness. This follows with the idea of not letting the technology drive the curriculum, but letting your curriculum and learning objectives drive the technology. By evaluating software you will be able to make better decisions about what and how to effectively integrate a particular piece of software.

Evaluation of educational technology is important before, during, and after instruction takes place. Evaluation after instruction is a crucial component of a lesson that effectively utilizes technology and digital media. Teachers can rely on a variety of resources to help evaluate the appropriateness of educational technologies.

Depending on the nature of the evaluation you conduct, evaluation satisfies different goals such as

- **To Improve the multimedia product**: Improving your multimedia educational material is an overarching goal of evaluation. We work under the assumption that a product is never perfect, but that it is nevertheless good enough that it can be revised in order to be used again when you go through the next iteration of the multimedia development cycle. Evaluating in order to make improvements is known as **formative evaluation.** Even if you can be absolutely sure that the multimedia educational product will not be used again after it has been deployed, going through the evaluation process allows you to refine your critical stance towards the multimedia products that you develop in the future.

- **To help assess the effectiveness of instructional Material:** Judging the effectiveness of your instruction is known as **summative evaluation.** If the multimedia materials form but one component of an educational intervention strategy, a summative evaluation of your multimedia educational materials can be a part of the larger goal of assessing the effectiveness of the educational intervention.

- **To improve your Skills or the skills of your team in instructional media development:** Knowing where you did a good job and where you didn't do as well, *and why*, are key to your personal development as an instructional designer.

- **To improve the multimedia development process:**The multimedia development process is an idiosyncratic one; the type of clients that you attract, the personalities and abilities of the people in your team, the professional experience you and your team possess, and the resources that are available to you all affect the development process. No development process template can replace repeated *and informed* experimentation with developing multimedia educational materials.
- **To comply with requirements:**

  One reason that you conduct evaluation is that you have been required to, either by some regulatory body or by your client. One variation of evaluating because of compliance is evaluating instructional multimedia materials to see if they comply with standards. Standards-based evaluation is covered later.

- **To contribute to knowledge of evaluation Theories and Practices:** It is possible that in the process of trying to design your monitoring and evaluation tools, you come up with new and useful theories and practices on educational technology; in this case, you could provide a great deal of benefit to a great number of people if you share your insights to a community of like-minded professionals!

Criteria to evaluate Educational Technology

Students, instruction, process

Evaluating your multimedia educational materials ultimately is the process of engaging not just with the question, "How well did the students learn?" but also with the question, "How much of the students' learning is due to the multimedia educational materials you've created?"

1. **Cost**

The material of educational technology should be evaluated on the basis of its cost effectiveness.

2. **Usability-usefulness**

- Usefulness
    - Usefulness is related to pedagogical effectiveness, cognitive efficiency, and appeal.
    - Users can learn from their interactions with useful multimedia material.
    - To be useful, multimedia material has to be usable in the first place.
- Usability
    - Usability is related to functional correctness, perceptual efficiency, and technological efficiency.
    - User can perceive, view, interact with, and navigate usable multimedia material.
    - Usability is more basic than usefulness. If something is not usable, it is guaranteed not to be useful

3. **Content**

- Content is current.

- Content is accurate.
- Content supports curriculum.
- Scope (range) and depth of topics are appropriate to student needs.
- Material has significant illustration, example, references.
- The level of difficulty is appropriate for the intended audience.
- **Content integrates "real-world" experiences.**

4. Instructional Design

Evaluation of the instructional design of the resource involves an examination of its goals, objectives, teaching strategies, and assessment provisions. Evaluators should begin with the instructional objectives and work through the methodology. The following items should be judged on their contribution to the overall objectives of the resource.

- . Instructional goals and learner objectives are clearly stated.
- The resource is suitable for a wide range of learning/teaching styles.
- The resource promotes student engagement.
- The methodology promotes active learning.
- The methodology promotes development of communication skills.
- The resource encourages group interaction.
- The resource encourages student creativity.
- The resource allows/encourages student to work independently.
- The resource is suitable for its intended purpose.
- Materials are well organized and structured
- . Materials have unity/congruency.
- Concepts are clearly introduced.
- . Concepts are clearly developed.
- . Concepts are clearly summarized.
- Integration across curriculum subjects is supported.
- Non-technical vocabulary is appropriate.
- Technical terms are consistently explained/introduced.
- Pedagogy is innovative.
- Adequate/appropriate pre-teaching and follow-up activities are

provided.

- Adequate/appropriate assessment/evaluation tools are provided.

. Text relates to visuals.

5. **Technical Design**

- Appropriate support materials are provided.
- Visual design is interesting/effective.
- Illustrations/visuals are effective/appropriate.
- . Character size/typeface is appropriate.
- . Layout is logical and consistent.
- Users can easily employ the resource.
- Packaging/design is suitable for the classroom/library.
- The resource makes effective use of various mediums**.**

6. Social Considerations

- **Gender/Sexual roles:** Any portrayal of gender issues in approved resources should be relevant to the curriculum for which the resource is being considered, and appropriate for the age level of the intended audience.
- **Sexual orientation**

Resources should reflect positive awareness and sensitivity in the portrayal of diverse sexual orientations. Any reference to sexual orientation should be in the context of the curriculum for which the resource is being considered, and appropriate to the age level of the audience.

- **Belief systems**

A belief system is an organized set of doctrines or ideas (philosophy, religion, political ideology). Approved resources should neither overstate nor denigrate any belief system.

- **Age**

Resources should portray different age groups, and reflect society's treatment of them.

- **Socio-economic status**

Resources should address socio-economic issues, including biases,
values, and perspectives related to income.

- **Political bias**

Resources should avoid political bias (e.g., no one political point of view should be advocated over any other). Some topics may be particularly sensitive (e.g., land use, elections, environment, agricultural practices).

- **Regional bias**

Approved resources should not exclude one geographical region in favour of another exploration and settlement of one regional area)

- **Multiculturalism (and anti-racism)**

The perspective from which information is presented in resources is important. It is not sufficient to merely include in texts or videos pictures of multicultural people

- **Special needs**

The effective promotion of awareness of the capabilities and contributions of children and adults with special needs is important. Their integration into education as fullfledged, respected, participating members of society is desirable. It is also of note that students with special needs have diverse backgrounds. These additional diversities and challenges need to be acknowledged.

- **. Ethical/legal issues**

Issues subject to debate on moral or legal grounds should be examined closely, considering accuracy and currency of data, and evaluating for bias.

- **Language**

The use of specialized language should be suited to the context, maturity, and intellectual level of the audience.

- **Violence**

Incidences of violence, where present, should be suited to both the context and the maturity level of the audience.

- **Safety standards compliance**

Activities portrayed should comply with legal and community standards of complance

5.7 Resource centers for Educational Technology and their activity for improvement of teaching learning

There are several institutions working for designing, developing, researching at state, national, international level for the promotion of educational technology. These institutes are mainly focusing on the use od educational technology based material for the improvement of teaching learning. These centers are thus known as resource centers of Educational Technology. Some of the significant resource centers of educational technology are as follows:

5.71CIET

Central Institute of Educational Technology, a constituent unit of NCERT, came into existence in the year 1984 with the merger of Centre for Educational Technology and Department of Teaching Aids. It is a premier Institute of Educational Technology at the national level. Its major aim is topromote utilization of educational technologies viz., radio, TV, satellite communications and cyber media either separately or in combinations and its appropriate use to enhance learning and improve productivity in classrooms and schools. The Institute undertakes various activities to widen educational opportunities promote equity and improve quality of educational processes at the school
level.

Role and Functions of the Institute:

The broad areas of activities of CIET are listed below:

To design and produce media software materials viz., television/ radio (for both broadcast as well as non-broadcast use) film, graphics and other programs for strengthening the transaction of curricular and co-curricular activities at the school level.

- To create competencies in development and use of educational software materials through training in areas such as script development., media production, media communication, media research, technical operations, setting up studios, repair and maintenance of equipment.
- To develop plans for the use of Information and Communication Technologies in education.
- To train the faculty of IASE/CTE & DIETs in the use of Educational Technology in their teacher education programs.

- To undertake research, evaluation and monitoring of the systems, programs and materials with a view to improving the materials and increasing their effectiveness.
- To document and disseminate information, materials and media programs for better utilization.
- To advise and coordinate the academic and technical programs and activities of the State Institutes of Educational Technology (SIETs) set up by the MHRD in six states of India.
- To design and produce media software especially mass media viz., educational radio and television; interactive multimedia and web based learning resources utilizing ICT to enrich the transactions of curricular activities at different levels of school education.
- To optimize the utilization of EDUSAT communication technologies and terrestrial transmission on national channels: Doordarshan, Gyan Darshan and Gyan Vani.
- To explore and infuse the appropriate and critical use of interactive digital content, web based communication and participatory networks.
- To undertake research and evaluation studies for assessment of need, preparation of audience profiles; undertaking monitoring and evaluation of systems programmes and materials to improve their effectiveness; to study their impact on learning processes, development of children and teachers and efficiencies of systems.
- Documentation of educational media programmes and research for enhancing utilization.
- Dissemination of media programmes through broadcast and non-broadcast modes through the distribution of ACDs, VCDs, DVDs, multimedia CDs and the web.
- Organise capacity building programmes for teachers and teacher-educators in concepts and applications of techniques and technologies for improving classroom instructions and their management processes and State Institute of Educational Technology (SIET) personnel in scripting, production of media programmes, communication and media researches and technical operations.
- To advise and coordinate (a) academic and technical programmes of the five State Institutes of Educational Technology (SIETs) (b) implementation of the National Policy of ICT for School Education, ICT@Schools Scheme.

- To provide consultancy to various organizations and individuals in the development, utilization and evaluation of educational technologies

The Focus Areas of the Institute

Develop e-content, disseminate e-contents through various modes (transmission, non-transmission through NROER and sales mechanism) and integrate ICTs in teaching learning process through capacity building among teachers through blended mode.

Regular Programme/Activities being Organised

- Development of e-contents (audio, video, multimedia, etc.)
- Training and retraining of teachers and teacher educators in Educational Technology and new ICT.
- Disseminate e-contents through telecast/broadcast on DD -1, Gyan Vani, Gyan Darshan channels and sales mechanism
- Third Party Evaluation of ICT Scheme in schools of Karnataka state and UTChandigarh

Significant Activities/Works Carried out in the Recent Past

- Developed ICT curriculum for students and teachers
- Developed National Repository of Open Educational Resources (NROER)
- Organized training programmes for teachers and teacher educators of 15 States/UTs through face to face and distance mode
- Organized All India Children's Educational Audio Video Programmes, Contests and
- National ICT Award for school teachers

Collaboration with International/National Organisations/Agencies, etc.

- IGNOU and Doordarshan for telecast and broadcast of Audio/Video programmes
- HBCSE-TIFR Mumbai for creation of NROER
- SIETs, Viyan Prasar, CCRT, IGNCA, SCERTs for sharing of e-contents on NROER.
- CEMCA for development of QAMLM and promote FOSS environment
- NIC for hoisting of Websites: ncert.nic.in, ciet.nic.in, nroer.gov.in, itschools.gov.in

5.72 UGC

The role of University Grants Commission in promoting educational technology has been reflected in constitution pogf Consortium of Educational Commission which is a inter university center in 1993. It has been established with the goal of addressing the needs of Higher Education through the use of powerful medium of Television alongwith the appropriate use of emerging Information Communication Technology (ICT).

Realizing the potential and power of television to act as means of Educational Knowledge dissemination, UGC started the Countrywide Classroom Programmes in the year 1984. For production of such programmes Media Centres were set up at 6 Universities. Subsequently CEC emerged in 1993 as a nodal agency to coordinate, guide & facilitate such Educational production at the National level. Today 21 Media Centres are working towards achieving this goal under the umbrella of CEC.

It has following objectives:

- Close coordination , facilitation overall guidance and direction to the activities of media centers set up by UGC in various universities.
- Dissemination of educational programmes through bothy broadcast and non broadcast modes.
- Producttion of educational programmes in video and audio forms and related support materials and setting up of related facilities for this.
- Undertaking researches related to optimizing the effectiveness of the programme
- Providing forum for the active involvement of academic and other scholars in the creation of adequate educational programme.
- Studying, promoting and experimenting with new techniques/technology that will increase thew reach and effectiveness of educational communication.

5.73 IGNOU

Indira Gandhi National Open University (IGNOU) was established by an Act of Parliament in 1985 , has continuously striven to build an inclusive knowledge society through education as said by the University itself.

But have you ever thought about how a university can use the technological resources effectively to help the masses to get connected in this modern technological world ? Well, this university is a good example to the thought we questioned.

With the launch of **EduSat** (a satellite dedicated only to education) on **20th September, 2004**, and the establishment of the Inter-University Consortium, the University has shined in a new era of technology-enabled education in the country. All the regional centres and high enrollment study centres have been provided with active two-way video-conferencing network connectivity, which has made it possible to transact interactive digital content. Thus, helping India to get digitalized at a faster rate.

By its thoughts and aims it now successfully serves the educational aspirations of over 3 million students in India and other countries with distance education. It mainly aimed on ways to provide access to higher education to all segments of the society.

It uses technological resources to help establishing distance free education by its Broadcast services like Gyan Vani , Gyan Darshan – I and so on. The students are also facilitated with SMS alerts on any notice to their importance.

The IGNOU university has developed virtual classrooms or online classroom with the help of **eGyanKosh**. The virtual classrooms opens the door to the students who have any issues to attend the university classes.

Its main activities with respect to educational technology are

To promote and dissemination of advance knowledge through sustainable Open and Distance learning system,

- To Strengthen the development of the National Resource Centre as a proactive role model for high-quality and learner-centric Open and Distance Learning system,
- Share professional capabilities and resources to improve standards of distance education in the country,

- Periodically assess and accredit institutions of Open and Distance Learning to promote centres of excellence in the country,
- Develop networks, using emerging technologies and methods,
- To meet the challenges of access and equity,
- Take education to the hitherto unreached and promote community participation for local development through life-coping skills,
- To provide specific need-based education and training opportunities for continuous professional development and skill up gradation to in-service professionals, and
- Strive towards continuous development of methods and strategies for research and development

5.74 NIOS

NIOS or National Institute of Open School Formerly known as National Open School. It is an Autonomous organization under MHRD and Established in 1989 in pursuance of NPE1986 which is the Largest Open Schooling System in the World. It has More than 5,00,000 learners per year and 5000 study centers . It Imparts education through distance mode through various media

NIOS is an "Open School" to cater to the needs of a heterogeneous group of learners up to pre-degree level. It was started as a project with in-built flexibilities by the Central Board of Secondary Education (CBSE) in 1979. In 1986, the National Policy on Education suggested strengthening of Open School System for extending open learning facilities in a phased manner at secondary level all over the country as an independent system with its own curriculum and examination leading to certification.One of the major activities of the NIOS is to make use of modern means of Communication and Educational Technology in distance Education. Audio and Video programmes are significant components of the multi-media packages offered by NIOS for its various courses of study. The audio/video programmes supplement and complement the other modes of learning such as printed self learning materials and personal contact programmes.

Activities

To take steps for developing strategy plans for promoting and up scaling the Open Schooling program in India,

- To provide technical and financial support to State Governments for setting up and up scaling of State Open Schools (SOSs),
- To develop needed action plan for making education equitable and inclusive for the marginalized and disadvantaged groups like girl/women, minorities, differently- able (physically and mentally challenged) etc.,
- To offer courses of study in general, vocational and continuing education and life enrichment courses up to pre-degree level,
- To develop need based Curricula and Self Learning Materials with focus on skill development,
- To develop multi-media and multi-channel delivery modes for effective transaction of courseware,
- To provide effective student support services,
- To conduct examinations and issue certificates to successful learners,
- To partner with National Literacy Mission,
- To promote quality of learning in ODL through Monitoring, Supervision and Evaluation,

- Functions of Media Unit are as follows:
- Production of Audio/Video programmes for NIOS learners.
- Broadcast and Telecast of Audio/Video programmes on different channels.
- To produce Audio/Video Spots for publicity purposes.
- To produce Multimedia programmes for NIOS learners.
- Duplication of Audio/Video programmes to Audio CDs, VCDs etc., to enrich and reinforce the subject matter given in the study material, provided to the NIOS learners.
- Video coverage of important functions/seminars, workshops, etc.
- NIOS is planning to setup a Media centre i.e. Audio and Video studio facilities for in-house productions and a Community Radio station in its H.Q.

- A 24 X 7 Educational Channel is likely to be started in near future. NIOS in collaboration with CIET, NCERT will jointly run this channel. NIOS Video programmes would be telecast on this channel.
- The Media Unit, NIOS ensures an academic perspective along with the technical responsibilities of production of audio and video programmes, which are one of the most important components of the multi-channel package offered by the NIOS. These audio and video programmes both supplement and complement the other channels of learning: i.e. printed self-learning materials and personal contact programmes. Most of the programmes, except for the language courses (Hindi, English, Urdu), have been produced both in English and Hindi Version. Using documentary, docu-drama and other interesting formats, these programmes attempt to present the topic/theme in a simple, interesting and engaging manner, so that the learners get a clear understanding and insight into the subject matter.
- The video programmes are being telecast on DD-I from 05.02 a.m. to 05.25 a.m. on every Friday and on Educational Channel - Gyan Darshan on every day from 6.30 p.m. to 7.00 p.m. The audio-video cassettes are also sent to AIs, AVIs, SAIEDs and Regional Centers of NIOS

5.75 State E T Cells

State council of educational research and training (SCERT) or Statew Institute of Education (SIE) IS established in each state which are related to the directorate of education . Each SCERT has a stat educational technology state that works for promoting educational technology in that concern state.It h Administrative control and monitoring of in-service training of secondary school teachers with respect to awareness and enrichment programmes in educational technology

- Coordination of various programs of training in educational technology for secondary school teacher, teacher educators and educational administration which are conducted by N.C.E.R.T. and N.U.E.P.A., Regional College of education and other various National Level and Regional level education agencies.
- Provides academic inputs and infrastructure for schools, DIETS, CTES, IASEs.
- Prepares curriculum, textbook, teaching learning materials for school education.

- Conducts research in the field of educational technology.
- Organization of training courses of Audio Visual Education and Education Technology.
- Organization of film library including loaning of films and other components to schools.
- Inspection and repair of Audio Visual educational machinery in schools.as following functions:

5.76 AVRC

The full name of AVRC is Audio-visual resource centre. As early as in 1984 **University Grants Commission (UGC)**, New Delhi has launched Country Wide Class Room (CWCR) and production facilities at 6 Universities in India through establishing media centers in the name of Audio Visual Research Centers (AVRCs) (AVRCS) (later these centers have been renamed as **Educational Multimedia Research Centers (EMMRCS)**. This was mainly to use electronic media for the quality enrichment of higher education. UGC began its transmission of Country Wide Class Room (CWCR) program from 15thAugust 1984 through Doordarshan National network. Initially the co-ordination with these centers was done from UGC office with the support of a consultant. Subsequently, an Inter-University Centre named as 'Consortium for Educational Communication' (CEC) was set up in the year 1993 to co-ordinate with media centers (AVRCs and EMMRCs) and to make CWCR mission most effective and successful

Audio Visual Research Centre provides valuable resource material for higher education and mass communication. The programmes produced at the centre are televised under UGC/CEC countrywide classroom programme. During 1996-97, the centre produced 16 educational programmes covering various subjects like earthsciences, ecology, wildlife, chemistry, maths, sports, social sciences and classical dance etc. despite staffing constraints. Of these 6 programmes were produced in Hindi.

The centre also undertakes research in all aspects of educational technology in relation to learning for both urban and rural collage going students in various disciplines. It invites faculty from within and outside the University as subject experts to participate in the activities of the centre to write scripts on the topics of their subject specialisation followed by the production of film. The centre has made about 180 programmes covering various subjects and areas.

The AVRC is an academic support unit that exists primarily to facilitate speedy, prompt and precise service for audio-visual related requests and services of the institution.

It envisions itself as the provider of world class and competitive audio-visual materials, equipment and facilities served by highly-competent and skilled staff traits needed in the daily transactions.

Specifically, the AVRC aims to:

1. Deliver updated, reliable and functional instructional equipment and materials;

- Respond quickly to the needs and requirements related to audio-visual resources of the University ;
- Facilitate the effective orientation and technological skills development of its end-users;
- Provide efficient and reliable means of ID processing and production; and
- Acquire feedback and conduct research for the improvement of the AV services and materials.

5.77 EMRC

Educational Multimedia Resource Centre is also known as EMRC which has been Started by UGC in 22 Universities of India

Activities:

- To produce high quality audio-visual programs,
- Developing multimedia content,
- Producing educational documentaries,
- Produce lecture series and e-content modules on undergraduate program,
- Studying, promoting and experimenting with new techniques/technology that will increase the reach/effectiveness of educational communications,
- Preparing documentary films,
- Produce interactive multimedia learning materials,
- Providing training in audio/video/multimedia production,

5.78 NIST

The National Institute of Standards and Technology (NIST) is offering support to qualified institutions interested in developing teaching materials and curricula that instruct students in the nature, role and importance of technical standards in modern society and commerce.Founded in 1901, NIST is a non-regulatory federal agency within the U.S. Department of Commerce. NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

NIST carries out its mission through the following programs:

- the NIST Laboratories, conducting world-class research, often in close collaboration with industry, that advances the nation's technology infrastructure and helps U.S. companies continually improve products and services;
- the Hollings Manufacturing Extension Partnership, a nationwide network of local centers offering technical and business assistance to smaller manufacturers to help them create and retain jobs, increase profits, and save time and money; and
- the Baldrige Performance Excellence Program, which promotes performance excellence among U.S. manufacturers, service companies, educational institutions, health care providers, and non profit organizations; conducts outreach programs; and manages the annual Malcolm Baldrige National Quality Award which recognizes performance excellence and quality achievement;

5.8 Let us Sum up

From this unit you were exposed with latest technology utilized in the field of formal, informal and non formal technology. Distance and open learning is also dependent on educational technology for disseminating education to people who are unreached due to the geographical, social, financial and other barrier through TV, radio, satellite, computer, internet, CD, teleconferencing. The latest technology with smart phone, internet, INSAT is making education easily assessable to all. However you have found that some problems are there in using latest

technology in our classroom situation. You have also learnt about how to evaluate the resources of educational technology has been also described with certain criteria through formative and summative procedure. Further you have got a detail idea about different resource centers such as UGC, IGNOU, CIET, state ET cell, EMRC, AVRC, NIST etc and their activities to promote educational technology. We expect that you will utilize these latest technology and resource center in your class to make teaching learning more interesting and effective.

5.9 References

Atkinson, E. 1996. Open/Flexible Learning and the Open Learning Initiative. Proceedings of the 2nd International Conference on Open Learning. 4-6 December 1996. Brisbane, Qld Australia, 45-48.

Bates, A. W. 1996. The Impact of Technological Change on Open and Distance Learning. Keynote Presentation in Proceedings of the 2nd International Conference on Open Learning. 4-6 December 1996. Brisbane, Qld Australia.

Maxwell, L. 1995. Integrating Open Learning and Distance Education. Educational Technology November-December, 43-48.

Wylie, A. 1996. Open Learning: If it Looks Like DE, it's Okay. Proceedings of the 2nd International Conference on Open Learning. 4-6 December 1996. Brisbane, Qld Australia, 286-293.

http://www.helsinki.fi/~tella/ole4odl.html

http://en.wikipedia.org/wiki/Distance_education

http://www.onlinecolleges.net/10-amazing-emerging-tech-trends-in-elementary-education/

http://www.itdl.org/Journal/Aug_10/article01.htm

“Essentials of Educational Technology” By Mangal, 2009 ISBN 978-81-203-3723-7

http://www.warwick.ac.uk/ETS/Publications/Guides/internet.html

http://www.ehow.com/about_5437063_types-technology-used-classroom.html

"Essentials of Instructional Technology" By A. R. Rather, ISBN 81-7141-818-X, 2004,

"Educational Technology" By K. L. Kumar, 2004.

http://www.ijeie.in/index.php/articles/archives/volume-2/vol-2-issue-5-sept-2013/english/158-application-of-educational-technology-in-formal-and-non-formal-education 2012

https://sites.google.com/a/upou.edu.ph/edde-221/modules/unit-3/module-6

. television: Broadcast, Cable, and Satellite Television Transmission http://www.infoplease.com/encyclopedia/science/television-broadcast-cable-satellite-television-transmission.html#ixzz3bbpQprge

http://www.preservearticles.com/2012011821102/short-essay-on-insat-for-education.html

Read more: television: Broadcast, Cable, and Satellite Television Transmission http://www.infoplease.com/encyclopedia/science/television-broadcast-cable-satellite-television-transmission.html#ixzz3bbpa62Uq

www.gov.pe.ca/photos/original/ed_ESLR_08.pdf