

UNIVERSITY GRANTS COMMISSION

EDUCATION

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Unit -8: Technology in/for Education

Sub Unit-8.1. [Concept of Educational Technology (ET) as a discipline]

Topic-8.1.0

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2.	8.1.2	Communication Technology(CT)
3.	8.1.3	Information Communication Technology(ICT)
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Sub Unit-8.2. [Systemic Approach to Instruction Design]

Topic-8.2.0

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Sub Unit-8.4. [Use of ICT in Evaluation, Administration and Research]**Topic-8.4.0**

Sl.No.	Topic
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3.	8.4.3 Online and Offline assessment tools

Section – 1 Unit at a Glance

Sub Unit-8.1. (Concept of Educational Technology (ET) as a discipline)

8.1.1 *Information Technology (IT)*: The term information technology was coined by the *Harvard Business Review*, in order to make a distinction between purpose-built machines designed to perform a limited scope of functions and general-purpose computing machines that could be programmed for different tasks. As the IT industry developed from the mid- 20th century, computing capability advanced while instrument cost and energy consumption fell lower. IT could be described – Computer (an electronic device that can process and store information) vs. telecommunications (transmission of information between devices in different locations). – Hardware (the physical equipment) vs. software (the instructions) is the second categorization that will be used for further exploration of IT below, together with exploring the data that is handled by IT.



8.1.2 *Communication Technology (CT)*: Communication Technology is also comprised of two words like —Communication & Technology. This technology is the science of the application of knowledge to practical purposes. You also know that information means any communication or representation of knowledge in any formation. Systems for example telephone, telex, Fax, radio, T.V. and Video are included, as well as more recent computer based technologies, including electronic data interchange and e-mail.

8.1.3 *Information Communication Technology (ICT)*: Information and communication Technology is a field that has a wide coverage. It thoroughly deals with communication technology and how it impacts on other fields of human exertion. It is the fastest flowing academic fields of study and a viable source of livelihood. It is the convergence of telephone and computer networking through a single cabling system either ease of data storage, manipulation, management, and retrieval. It is concerned with database management, computer programming, and software development.

8.1.4 *Instruction Technology*: IT consists of both synchronous and asynchronous technologies. Synchronous technologies allow learners and educators to interact at the same time virtually, while asynchronous technologies allow learners to engage in educational activities at their preferred time based on the requirements of the course (Bastable, Gramet, Jacobs, & Sopczyk, 2010). A systematic measure of designing, execution, and evaluating the total process of learning and teaching in terms of inelastic objectives, founded on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction.

8.1.5 *Applications of Educational Technology*: Educational technology has not only maintained the standard of educational but also improved the edgeways of teaching by giving teaching aids and programmed instructional material. The main force of development of the theories of teaching and instruction is providing by educational technology. Mechanism of feedback devices for modification of teaching learning behavior can produce effective teachers in training schools. Television, radio, tape-recorder and programmed instruction can also do wonders in the field of distance and correspondence education.

8.1.6 *Theories and their Implications to Instructional Design*: 'Instructional design', and also instructional systems design (ISD), is not a totally new concept. Its origins can be found in numerous earlier efforts to improve instruction. It has even been suggested that its roots can be traced to the early Greek philosophers. Over the years, many experts in the fields of education and psychology have made main contributions to the science of instructional design. Instructional designers today consider the work of E.L. Thorndike, who founded his instructional strategies in 1913, as very valuable. Thereafter, in 1924, Bobbitt introduced his work on job analysis, and Tyler followed in 1942 with his work on objectives and criterion- referenced testing (Briggs et al., 1991)

8.1.7 *Relation between Learning Theory and Instructional Design:* Behavioral learning theory can be summarized as learning that occurs through the behavioral response to environmentally sourced stimuli

[1]. the strictures of this theory are built upon assumptions that "have little regard for the cognitive processing of the learner involved in the task"

[2]. the assumptions take into account 3 criteria:

- The instructional task is the focus of a behavior response,
- The learning occurs by the influence of environmental stimuli, and
- The learning occurs through the process of exercise of the behavior.

8.1.8 *Instructional Strategies:* Instructional strategies are the techniques / methods that a teacher can accept to meet the different learning objectives. These strategies help students to walk on the path of independent learning and arrive strategic learners. They prepare teachers to make learning fun and help students to shake up their desire to learn. Instructional strategies hub on not only the educational content but also on the method and environment of the teaching process. Students' development level, interests and experiences are discussed while choosing a particular teaching strategy so that they can self-accomplish their goals. [This pathway on classroom management strategies can help you identify which instructional strategies strength is best for your environment.](#)

Sub Unit-8.2. [Systemic Approach to Instruction Design]

Topic-8.2.0

8.2.1 *Systemic Approach to Instruction Design:* The concept ‘Systems Approach’ came into use in relation with complex man-machine system. In World War II teams of scientists were commissioned to consider the problems faced by Great Britain during the first Nazi bombings. The successes realized by these scientists, working systematically in teams both in Great Britain and America, culminated in an enthusiastic attempt to apply the same techniques to finding solutions to problems in non-military settings. The approach was introduced in industry and then expanded into non-military government, agencies. Today, scientific, systematic approach to problem solving decision-making and planning is widely used in the social service and educational professions. Today, it is used in the field of education as a strategy to manage and improve the process and products of education.

8.2.2 *Models of Development of Instructional Design:* Instructional design model presents guidelines to organize appropriate pedagogical scenarios to achieve instructional goals. Instructional design can be defined as the practice of constructing instructional experiences to help facilitate learning most effectively. Driscoll & Carliner (2005) states that design is more than a process; that process, and resulting product, represent a framework of thinking. Instructional design models describe how to conduct the various steps. These steps involve instructional design process. The models help trainers and educators to guide and plan in total process.

8.2.3 *Gagne’s Nine Events of Instruction:* Gagne’s Model This theory of learning suggested that learners learn in many ways. To acquire the best learning methods, we need various types of instructions. Gagne as a military research director in 1958 was not contented with theories about instructional design by his predecessors and began to formulate his own principles of learning. (Rita C. Richey 2000) observed instructional design as a two drawn in phenomenon:

8.2.4 *Five E's of Constructivism:* In the 5 E model of instruction, students construct knowledge and meaning from their experiences. This model was developed as part of a BSCS (Biological Sciences Curriculum Study) to improve the science and health curriculum for elementary schools. The 5 E method is an example of **inquiry-based learning**, in which students ask questions, decide what information enhances their understanding, and then self-assess. The research showed positive results when the 5 E model was adopted by schools. Standardized tests scores showed that those students in classrooms using the BSCS science program for two years were four months ahead of students in other classrooms.

8.2.5 *Nine Elements of Constructivist Instructional Design:*

- 1) Reception
- 2) Expectancy
- 3) Retrieval
- 4) Selective Perception
- 5) Semantic Encoding
- 6) Responding
- 7) Reinforcement
- 8) Retrieval
- 9) Generalization

8.2.6 *Application of Computers in Education:* Computers are one of the greatest valuable resources in a classroom because they distribute so many adjuvant functions. With computers and the internet, students today have a substance of information at their finger tips that can help them develop their research and communication skills while blueprint them for a future profession in a workforce that is increasingly contingent on computer technology. Computer-Assisted Instruction (CAI), *Computer Based Training*, CAI - *Computer Assisted Instruction* ,CAL - *Computer Assisted Learning* ,CALL - *Computer Assisted Language Learning* ,WBI - *Web Based Instruction* ,WBT - *Web Based Training*

8.2.7 *ODLM:* Two-way communication assumes learners and tutors to interact as prominent from the passive receipt of broadcast signals. Communication can be synchronous or asynchronous; Probability of face-to-face meetings for tutorials, learner–learner interaction, library study, and laboratory or practice sessions; an Use of industrialized processes; that is, in large-scale open and distance learning operations, labor is divided and suites are assigned to several staff who works together in course development teams. Systems approach to open and distance learning a systems approach sets the conditions for proceeding in an orderly way. A systems approach also recognizes that all the components of the system are interrelated.

8.2.8 *e -learning*.: E-learning has proved to be the best means in the corporate sector, especially when training programs are conducted by MNCs for professionals across the globe and employees are efficient to acquire important skills while sitting in a board room, or by having seminars, which are guided for employees of the same or the different organizations under one roof. The schools which use E-learning technologies are a step fore of those which still have the traditional approach to learning. A learning process based on enacts teaching but with the help of electronic component is known as E-learning. While teaching can be based in or out of the classrooms, the use of computers and the Internet forms the major component of E-learning.



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Sub Unit-8.3. [Emerging Trends in e learning]

Topic-8.3.0

8.3.1 e -learning in Social learning: Social learning theory is a theory of learning process and social behavior which proposes that new behaviors can be acquired by observing and imitating others. It states that learning is a cognitive process that takes place in a social behalf and can occur purely through observation or direct instruction, even in the default of motor reproduction or direct reinforcement. In addition to the observation of behavior, learning also ensue through the observation of rewards and punishments, a process known as different reinforcement. When a particular behavior is rewarded regularly, it will most likely insist; conversely, if a particular behavior is constantly punished, it will most likely desist.

8.3.2 Open Education Resources: The idea of open educational resources (OER) has many working definitions. The term was first coined at UNESCO's 2002 Forum on Open Courseware and designates "teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been exempt under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. Open licensing is created within the existing framework of intellectual property rights as defined by pertinent international conventions and respects the authorship of the work"

8.3.3 e- inclusion: E-inclusion is a social movement whose objective is to end the digital divide , a term used to narrate the fact that the world can be divided into people who do and people who don't have entry to - and the capability to use - modern information technology (IT). According to advocates, e-inclusion has the strength to: close the gap between developed and less developed countries; develop democracy and mutual understanding; and entitle disadvantaged individuals, such as the poor, the disabled, and the unemployed.

8.3.4 Application of Assistive technology in e learning: Computer screen magnification descriptive video services, screen readers, Braille, scanning software, independent text reading, audio devices and Braille note takers. Personal frequency modulation, Infrared systems, Infrared Loop systems, Text Telephones, Computerized Speech Recognition, and Closed captioned TV. Augmentative and Alternative Communication, First words, picture exchange communication system, Hand held or computer electronic speech devices.

8.3.5 Quality of e learning: Indicate that the quality of education can be defined from three perspectives: technological, economic and pedagogical. The quality standards were associated with particular outcomes in the past. This meant that quality was evaluated on the base of courses quality and pre-defined learning outcomes. This approach changed in recent years. According to Bremer (Bremer, 2012), process-oriented approaches began to prevail. This means that not only the output, but also the quality of the entire process is subject to evaluation.

8.3.6 Ethical Issues of e learning and teaching: In interacting with others face-to-face we get immediate feedback on unsuitable and unethical behaviors, also if it is as subtle as body language. In using information technology in a way that could injury to others, the act feels less personal because we can't see or hear the other person in the exchange. The report goes on to note that traditionally moral values were learned at home and usually recovered in school. We cannot count on that today. Values are not being learned at home and schools are often restricted in their nature teaching social values. Our young people are becoming psychologically distant in their interactions with others.



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Sub Unit-8.4. [Use of ICT in Evaluation, Administration and Research]

Topic-8.4.0

8.4.1 *E- portfolios:* An electronic portfolio (also known as a digital portfolio, online portfolio, e-portfolio, e-folio, or eFolio) is a gathering of electronic evidence assembled and managed by a user, usually on the Web. Like this electronic evidence may include input text, electronic files, images, multimedia, blog entries, and hyperlinks. E-portfolios are both demonstrations of the user's abilities and entresol for self-expression. If they are online, users can hold down them dynamically over time. E-portfolios, like traditional portfolios, can reflex students' reflection on their own learning, leading to more awareness of learning method and needs. Comparative research by M. van Wesel and A. 'Prop between paper-based portfolios and electronic portfolios in the same setting tentatively suggest that use of an electronic portfolio may lead to better learning outcomes.'

8.4.2 *ICT for Research:* ICT had effects on many facets of social science research. They can be classified into three categories which include: a) ICT application in pre-data analysis, b) ICT application in data analysis, and c) ICT application in post data analysis. ICT application in pre-data analysis reference to examples how ICTs are applied on activities of social science research before propagates the stage of data analysis. There are thousands of digital tools for researchers to help you through your journey to find an interesting fact. Covering details of every tool is wide the scope of this article. We have covered most important ICT products which helps you in exploring the literature, content curtain, share data and code, connect with others, tools required for data collection & evaluation, writing and publishing the paper.

8.4.3 *Online and Offline assessment tools :* Offline exam delivery, or offline assessment, is the method by which organizations can run computer-based examinations in remote areas where there is not a reliable internet connection available, instead of relying on a paper-based process which is stiff and hard to administer. True offline exams do not even require an internet connection on exam day, to launch or submit the exam. Electronic assessment, also known as '*digital assessment*', e-assessment, online assessment or computer-based assessment(CBA), is the use of information technology in assessment as educational assessment, health assessment, psychiatric assessment, and psychological assessment. This shroud a broad range of activity ranging from the use of a word processor for assignments to *on-screen testing*.

Section -2: Key Statements

Basic Key Statements: Progressive method (8.1), Transmission (8.1.1.1), manipulation (8.1.3), *Online courses* (8.1.5.2), *Computer conferencing* (8.1.5.3), Cooperative (8.1.5.4), Peer –tutoring (8.1.5.4), *Radio broadcasting* (8.1.6), *Cognitive strategy* (8.1.6.1), Systems Approach (8.2.1), accessory (8.2.2.1), ***Criterion-Referenced Test*** (8.2.2.3), *Generalization* (8.2.5), Enrolling (8.2.7.1), e- learning (8.2.8), M-learning (8.2.8.2.6), *Social bookmarking* (8.3.1), bloggers (8.3.1.3), User Satisfaction (8.3.5.1), Digital repositories (8.4.2.1), *Access* (8.4.2.2), *digital assessment* (8.4.3.1).

Standard Key statements: Telecommunications (8.1.1.1), Representation (8.1.2), New innovation (8.1.5), Self-learning (8.1.5.2), *Hybrid systems* (8.1.5.3), Personalized learning (8.1.5.4), *Reinforcement Schedules* (8.1.6.1), *Elicit performance* (8.1.6.1), Constructivism (8.1.6.3), *Instructional system* (8.2.1), misconceptions (8.2.4), multimedia technology (8.2.6.2), *Enhanced Personalization* (8.28.2.2), Social learning (8.3.1), Discussion forums (8.3.1.6), e-inclusion (8.3.3), Net benefits (8.3.5.1.5), E portfolios (8.4.1), digital library (8.4.2.2).

Advanced Key Statements: Station management (8.1.3), Asynchronous technologies (3.1.4), Synchronous technologies (3.1.4), Interactive media (8.1.5.1), *e-books* (8.1.5.2), *Videoconferencing* (8.1.5.3), Team teaching (8.1.5.4), *Motor skill* (8.1.6.1), Hypermedia (8.1.6.3), Maximum utilization (8.2.1), Standardized tests (8.2.4), virtual class (8.2.8.2), Tele- courses (8.2.8.2.2), *Webcasting* (8.28.2.4), **Blended learning** (8.2.8.2.5), Open Educational Resources (8.3.1), Web 2.0 (8.3.1.1), Creative Commons (8.3.2.1), Multiple access (8.4.2.2), offline assessment (8.4.3.1).

Unit -8: Technology in/for Education

Sub Unit-8.1. [Concept of Educational Technology (ET) as a discipline]

Technology- Technical' term of 'machine' or machine-related suffixes people usually associate with. But it is not necessary that the 'technical' should only be used in a machine or machinery. This means that any experimental work, in which scientific knowledge or principles should be used. It derives from the Greek word 'Technikos' which means—art. This is the synonym of the Latin language word 'Texere' which means for weaving or construction. According to Dr. Das -Any system of interrelated parts which are organized in a scientific manner as to attain some desired objective could be called technology.

Educational Technology- Educational Technology is an applied or practical study which aims at maximizing educational effect by controlling such relevant facts as educational purposes educational environment, conduct of student, behaviour of instructors and interrelations between students and instructors. Educational Technology is the application of scientific knowledge about learning to practical learning circumstance.

- It is a system of 5Ms- Machines, Materials, Men, Media, and Methods.
- E. E. Hadden's definition is said to be functional. It includes both the fundamental and practical aspects of educational technology.

1. The basis of educational technology is science.
2. Educational technology is the effect of science and technology upon education.
3. Practical aspects are important in educational technology.
4. Educational technology is a continuous progressive method.
5. Its goal is to improve the learning technique.
6. In the field of educational technology, psychology, engineering etc. are used.
7. In educational technology, systematic approach plays the main role.
8. Teacher, pupils and technical approaches are included in it.

- Lumsdane has categorized educational technology into three approaches —
 - (1) Hardware Approach or Educational Technology I (ET-1)
 - (2) Software Approach or Educational Technology II (ET-2)
 - (3) System Analysis or Educational Technology III (ET-3)

8.1.1 Concept of Educational Technology (ET) as a discipline-

The scope of educational technology is conceived by different individuals differently for example, persons dealing with audio-visual aids, while who are working in mass media emphasis the importance of hardware, software and communication technology. Educational Technology exists in a fragmented ways not only in India but also globally, there is a significant diversification in terms of objectives, topics and coverage of contents. However, a uniform concept and meaning of Educational Technology is being developed at the global level. Various disciplines of Educational Technology in details-

8.1.1.1 Information Technology:

- Information technology (IT) is a technology which uses computers to gather, process, store, protect, and transfer information. Today, it is common to use the term Information and communications technology (ICT) because it is unimaginable Information technology (IT) is the use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all type of electronic data.
- The term information technology was coined by the *Harvard Business Review*, in order to make a distinction between purpose-built machines designed to perform a limited scope of functions and general-purpose computing machines that could be programmed for different tasks. As the IT industry developed from the mid- 20th century, computing capability advanced while instrument cost and energy consumption fell lower.

- Information Technology (IT): describes an organization's computing and telecommunications hardware and software technologies that provide automatic means of handling and communicating information. From the above definition, two possible divisions of IT could be described – Computer (an electronic device that can process and store information) vs. telecommunications (transmission of information between devices in different locations). – Hardware (the physical equipment) vs. software (the instructions) is the second categorization that will be used for further exploration of IT below, together with exploring the data that is handled by IT.
- The objectives of IT: The objectives of IT are to provide better means of information of data messages in the form of written or printed records, electric, audio or video signals by using wires, cables and telecommunication techniques, IT plays a vital disposition in information handling due to developments such as reduction in computing time, capabilities of files on video discs, use of T.V as readymade information screen, telecommunication and satellite communication facilities etc. The objectives of IT in ICLs can be categorized into the following four groups.
 - (i) Supporting technical functions attached with acquisitions, technical processing, serial control, SDI/CAS, OPAC and convention work.
 - (ii) Supporting information storage, retrieval and dissemination systems.
 - (iii) Supporting management information distribution for libraries, especially analyzing library statistics.
 - (iv) It can best be used in service and orientation courses for practicing librarians, continuing education programs for faculty teachers of library and information science, correspondence education and library extension services.

8.1.2 Communication Technology (CT):

Communications technology, also known as information technology, refers to all aspects and programs that are used to process and communicate information. Professionals in the communication technology area specialize in the development, installation, and service of these hardware and software systems. Individuals who enter these bounds develop an understanding in the conceptions, production, evaluation, and distribution of communication technology devices.

- Communication Technology is also comprised of two words like —Communication & Technology. This technology is the science of the application of knowledge to practical purposes. You also know that information means any communication or representation of knowledge in any formation.
- Communication technology involves a range of technologies used for gathering, storing, retrieving, processing, analyzing, and transmitting information. Comprise communication systems and the technologies behind them- how they are designed, constructed and maintained.



- Communication Technology is the electronic systems used for communication between individuals or groups. It facilitates communication between individuals or groups. Who are not physically present at the same location? Systems for example telephone, telex, Fax, radio, T.V. and Video are included, as well as more recent computer based technologies, including electronic data interchange and e-mail.
- **Technology in Communication:**
 - I. Telecommunication
 - II. Invention of Radio
 - III. Invention of Television
 - IV. Invention of Computer.
 - V. Internet
 - VI. Wireless technology.
- **Important of CT:**
 - a. Speed and efficiency
 - b. Professional appearance and flavor
 - c. Vividness and greater appeal
 - d. Plenty of resources for data
 - e. Lot of facilities for revising, editing and formatting.

8.1.3 Information Communication Technology (ICT):

ICT stand for information and communication technologies and is defined, as a - diverse set of technological instrument and resources used to communicate, and to generate, disseminate, store, and conduct information. ICT means the technology which consists of electronic devices and associated human interactive materials that enable the user to employ them for a extensive range of teaching - learning processes in addition to personal use.

- “These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony.
- "ICT is that technology which uses the information to meet human need or purposes including processing and exchanging."
- Information and communication Technology is a field that has a wide coverage. It thoroughly deals with communication technology and how it impacts on other fields of human exertion. It is the fastest flowing academic fields of study and a viable source of livelihood. It is the convergence of telephone and computer networking through a single cabling system either ease of data storage, manipulation, management, and retrieval. It is concerned with database management, computer programming, and software development. Web designing, mobile application development, project management & development, security networking analysis, media equipments, computer engineering, computer studies, the internet, intranet, internet protocol(IP), system software, application software, signal technology, base station management .

➤ Important of ICT:

- It creates an analytical mind of students the help them study and proffer solutions to problems emanating from all related fields that employ it as a learning tools.
- Being an emerging academic field of study.
- Enhances computer networking globally known today as internet and intranet.
- It makes comprehension of other subjects easy.
- Virtually all fields of learning are amenable to ICT such as the application of projector for teaching in the classroom.
- The basis for e learning and online library.
- The exchange of ideas and inventions among information technology scholars locally and internationally.
- It accelerates economic development nationally.

8.1.4 Instruction Technology:

A systematic measure of designing, execution, and evaluating the total process of learning and teaching in terms of inelastic objectives, founded on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction. IT consists of both synchronous and asynchronous technologies. Synchronous technologies allow learners and educators to interact at the same time virtually, while asynchronous technologies allow learners to engage in educational activities at their preferred time based on the requirements of the course

- Instructional technology (IT) has been defined as the ability to share information using media-based technology (audio, text, video, image, etc.) to facilitate enhanced interaction between educators and targeted learners (Jedlicka, Brown, Bunch, & Jaffe, 2002).
- IT consists of both synchronous and asynchronous technologies. Synchronous technologies allow learners and educators to interact at the same time virtually, while asynchronous technologies allow learners to engage in educational activities at their preferred time based on the requirements of the course (Bastable, Gramet, Jacobs, & Sopczyk, 2010).
- ***Characteristics of Instructional technology (described by James Finn (1969):***
 - An intellectual technique
 - An application of that technique
 - A long period of training
 - An association of members
 - Enforced standards and a statement of ethics
 - A body of intellectual theory (p. 232)

➤ *The basic elements of instructional design include:*

1. Analyse - This phase involves analyzing the characteristics or profile of students, tasks to be learnt by students, the environment in which it is to be taught, and the goal to be achieved.
2. Design - In this phase a teacher is required to develop instructional/learning objectives, choose the teaching strategy including the methods to be followed, keep on the selection of technology tools and resources, and choose tools to assess the effect which could be a questionnaire, check list, interview schedule.
3. Develop - Once the learning objectives and teaching strategy are decided in the context of the environment and student profile, the next phase will be to develop materials to be used, including the learning activities, and check for its appropriateness and feasibility by formative evaluation.
4. Implement - In this phase the instruction is delivered to the intended target group, that is, the students using the materials and activities developed in the previous stage.
5. Evaluate - This last phase assesses the outcome of the instruction and whether the intended instructional/learning objectives are achieved using the assessment tools developed. If the objectives are not achieved, then one may have to re-examine all the previous.

8.1.5 Applications of Educational Technology:

Educational technology enhances the teaching-learning process and makes it more than effective and process oriented as well. Electronic and mechanical gadget which a reduction man possesses can be used for educational requirement. Educational technology has not only maintained the standard of educational but also improved the edgeways of teaching by giving teaching aids and programmed instructional material.

- The main force of development of the theories of teaching and instruction is providing by educational technology.
- It provides practice and strategies for reducing individual differences or strategies and practices.
- New innovation of system analysis in the field of educational technology.
- Structure as well as nature of teaching can be developed and enriched with the help of educational technology.
- Mechanism of feedback devices for modification of teaching learning behavior can produce effective teachers in training schools.
- Television, radio, tape-recorder and programmed instruction can also do wonders in the field of distance and correspondence education.

8.1.5.1 Applications of Educational Technology in Formal Education:

- 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.
- Visual Technology Aid-Smart Boards are a technologically advanced type of chalkboard. Special markers are used to write on the plank to display. Interactive media can display website pages and software programs so the class can see the program's application.
- Computer Technology Aid- Computer technology allows students to work on programs that enhance learning. There are a variety of programs that help students practice skills and test pacific 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 and lesson plans.
- Technology used in the classroom are-
 - i. Protectors
 - ii. Smart Technologies
 - iii. Interactive whiteboards/ Mimio Boards
 - iv. Classroom PCs
 - v. Technology Education for Teachers



8.1.5.2 Applications of Educational Technology in informal Education:

Informal education in generally covers every prospect of learning that doesn't take place in a normal school building. Homeschooling, or uncoiling, is one of the most common types of informal education. Going to far-flung areas where the youth can't go to school is a common mode to practice informal education in abundant third world countries. But for this article, we'll be tackling a type of informal education that's not conferred that much thought.

Self-learning is something any individual afford without needing direct help from teachers. With the advent of technology in recent years, it's even more possible for anyone with a computer. Learning extensively about Physics and Biochemistry is made practical practicable to all the resources provided by technology. Devouring books in local libraries is no longer the only option to expand your knowledge. Technology offers more options on how you can analyze and break the boundaries of human learning.

- *Download e-books.*

Isn't it frustrating when you want to read a book so much but it's in a library a thousand miles away from you, and it's too costly to purchase? Well, save yourself from scavenging in second-hand bookstores, because all of the books you can fancy of can be downloaded online.

- *Visit educational YouTube channels.*

Home of logging and viral internet videos, YouTube has more to offer than you can imagine. There's a bunch of channels that navel on educational videos.

- *Enroll in online courses.*

If you miss the standard ordination of education, there are online courses easily obtainableonline. What's even better is that most of them are free. Be it self-paced learning, webinars, or group studies, every field of knowledge are covered in the numerous open education websites.

- *Communicate with other learners.*

Distance learning gives students a possibility to explore options to learn from someone other than their teachers. If you're learning a new language, it's best to talk to someone who speaks the language.

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8.1.5.3 Applications of Educational Technology in non -formal Education:

Informal education is the lifelong process whereby each individual acquires attitudes, values skills and knowledge from daily experience and the educative influences and resources in his or her environment from family and neighbors, from work and play from the market place, the library and the mass media.

Applications of Educational technology in the Non-Formal education are

1) Computer Assisted Learning (CAL): The term computer assisted Learning covers a range of computer based packages, which aim to provide interactive instruction usually in a specific subject area, and many predate the Internet. In general the use of computers in education through CAL has been sporadic a great deal of effort was expended either little general impact.

2) Digital Resources: This could range from simply placing word documents on the Web for your students to download and print your PowerPoint presentation available after a lecture to creating web pages that make strike use of the media to streamed digital video and simple interactive CAL like programs.

3) Computer Mediated Communication: CMC can either be synchronous or asynchronous. All of these types of CMC you use will depend on what kind of discussion you want to take place

- *Email.*
- *Mailing lists.*
- *Usenet newsgroup.*
- *Computer conferencing.*
- *Internet Really Chat.*
- *Videoconferencing*
- *Hybrid systems.*

4) Computer Aided Assessment (CAA): The next step is to provide a way for students to assess their own progress and understanding of the material.

8.1.5.4 Applications of Educational Technology in Inclusive Education:

Inclusive Education is emerged on the concept of multiple intelligence and individual difference. There is evidence to say that all individuals are deveral from each other and no two individuals can completely like even if they have been brought up in the similar environment. Teachers should also understand that having high scholastic force is not the only measure of child's intelligence. What is important is to develop flexible student centered pedagogy capable of educating all students, including those who are disabled or disadvantaged. In an inclusive setting we look for greater participation of students with special educational needs in the culture and curricula of mainstream schools. In this endeavor we have to think of some techniques that permit all students who are different from each other to learn simultaneously in the same classroom.

➤ *Major Teaching Strategies:*

1. Use of Multimedia and computer assisted instruction
2. Team teaching
3. Cooperative
4. Peer –tutoring
5. e-learning environment for special educational needs
6. ICT for Inclusive classroom Project work structure

➤ *Need to technologies in inclusive education:*

- *Increased independence.*
- Personalized learning.
- Better connection with peers.
- Reduced anxiety.
- Easier communication.
- Improved academic skills.
- Education and Computer Skills Training for teachers
- Attitudinal Changes and Creating Awareness
- Organize training workshops for key community members
- Initial training programs for student teachers in colleges and universities.
- Reduce prejudice and discrimination among children.

8.1.6 Overview of Behaviorists, Cognitive and Constructivist Theories and their Implications to Instructional Design:

‘Instructional design’, and also instructional systems design (ISD), is not a totally new concept. Its origins can be found in numerous earlier efforts to improve instruction. It has even been suggested that its roots can be traced to the early Greek philosophers.

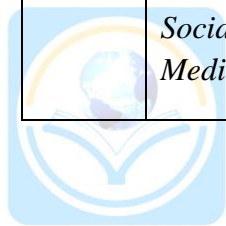
Over the years, many experts in the fields of education and psychology have made main contributions to the science of instructional design. Instructional designers today consider the work of E.L. Thorndike, who founded his instructional strategies in 1913, as very valuable. Thereafter, in 1924, Bobbitt introduced his work on job analysis, and Tyler followed in 1942 with his work on objectives and criterion- referenced testing (Briggs et al., 1991). During World War II, the US Military made extensive use of technological devices for training. During the 1960s, the focus reduced to work on systematic application of behavioral psychology to the design of instruction with particular property on self-paced individual interaction.

- Instructional Design is the art and science of creating an instructional environment and materials that will bring the learner from the state of not being able to accomplish certain tasks to the state of being able to accomplish those tasks. Instructional Design is based on theoretical and practical analysis in the field of cognition, educational psychology, and problem solving.
- Instructional design (ID), also known as ‘instructional systems design’ (ISD), is the practice of systematically designing, developing and delivering instructional products and experiences, both digital and physical, in a consistent and reliable fashion unto an efficient, effective, appealing, engaging and inspiring acquisition of knowledge. The process consists extensively of determining the state and needs of the learner, defining the end goal of instruction, and creating some "intervention" to assist in the transition.

➤ *Instructional Design history*

Era	Media	Characteristics	Outcome
1900s	<i>Visual media</i>	School museum as supplementary material (First school museum opened in St. Louis in 1905)	Materials are viewed as supplementary curriculum materials. District-wide media center is the modern equivalent.
1914-1923	<i>Visual media films, Slides, Photographer</i>	Visual Instruction Movement	The effect of visual instruction was limited because of teacher resistance to change, quality of the file and cost etc.
Mid 1920s to 1930s	<i>Radio broadcasting, Sound recordings, Sound motion pictures</i>	Radio Audiovisual Instruction movement	Education in large was not affected.
World War II	<i>Training films, Overhead projector, Slide projector, Audio equipment, Simulators and training devices</i>	Military and industry at this time had strong demand for training.	Develop of audio-visual instruction movement in school was slow, but audiovisual device were used broadly in military services and industry.
Post World War II	<i>Communication medium</i>	Suggested to consider all aspects of a communication process (influenced by communication theories).	This prospect first ignored, but eventually helped to enlarge the focus of the audiovisual movement.
1950s to mid-1960s	<i>Television</i>	Growth of Instructional television	Instructional television was not adapted to a greater extent.

1950s-1990s	<i>Computer</i>	Computer-assisted instruction (CAI) research started in the 1950s, became popular in the 1980s a few years after computers became available to general public.	The outcome of CAI was rather small and the use of computer was far from innovative.
1990s-2000s	<i>Internet, Simulation</i>	The internet offered opportunities to train many people long distances.	Online training grown rapidly to the point where entire curriculums were given through web-based training. Simulations are valuable but costly, with the highest level being used primarily by the military and medical community.
2000s-2010s	<i>Mobile Devices, Social Media</i>	On-demand training moved to people's personal devices; social media allowed for collaborative learning.	The effect from both are too new to be fully measured.



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➤ *McNeil defines the Instructional design as a:*

1. *Process:* Instructional Design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the total process of analysis of learning needs and goals and the development of a delivery process to meet those needs. It includes development of instructional materials and activities; and tryout and evaluation of all instruction and learner activities.
2. *Discipline:* Instructional Design is that branch of knowledge concerned with research and theory about instructional strategies and the process for developing and implementing those strategies.
3. *Science:* Instructional Design is the science of creating detailed specifications for the development, implementation, evaluation, and maintenance of situations that facilitate the learning of both large and small units of subject matter at all levels of complexity.
4. *Reality:* Instructional Design can start at any point in the design process. Once and again a glimmer of a concept is developed to give the core of an instruction situation. By the time the entire process is done the designer looks back and she/he checks to see that all parts of the “science” have been aching into account. Then the entire process is written up as if it occurred in a systematic fashion.

➤ *Instructional Design Phases*

- Analysis
- Design
- Development
- Implementation
- Evaluation

8.1.6.1 Behaviorists theories and Implications to instructional design:

This section on behaviorism is largely a synopsis of information from Paul Settler's book, (1990). The History of American Educational Technology In Paul Settler's book, he states that behaviorism did not have an influence on educational technology until the 1960s, which was the time that behaviorism indeed began to decrease in popularity in American psychology. Settler identified six areas that demonstrate the impact of behaviorism on Educational Technology in America: the movement; the phase; the movement; approaches, and the two instructions. The History of American Educational Technology behavioral objectives teaching machine programmed instruction individualized instructional computer-assisted learning (CAL) systems approach Behavioral Objectives Movement: A behavioral objective states learning objectives in "specified, quantifiable, terminal behaviors" (Settler, pp. 288, 1990). Behavioral objectives can be summed up using the mnemonic device ABCD (Schwier, 1998).

A - Audience - the student

B - Behavior - answer correctly

C - Condition - after having completed the unit, on a post test

D - Degree - 90% correct

To grow behavioral objectives a learning task must be crushed down through analysis into specific measurable tasks. The learning achieve may be measured by tests developed to measure each objective.

➤ *Robert Gagne developed his taxonomy of learning in 1972.*

Gagne's taxonomy was comprised of five categories:

- *verbal information*
- *intellectual skill*
- *cognitive strategy*
- *attitude*
- *motor skill*

1. **Skinner (1904 - 1990)** Like Pavlov, Watson and Thorndike, Skinner believed in the stimulus-response pattern of conditioned behavior. His theory deal with changes in observable behavior, disregard the possibility of any processes occurring in the mind. Skinner's 1948 book, is about a utopian society based on operant conditioning. He also wrote, (1953) in which he piercing out how the principles of operant conditioning function in social institutions such as government, law, religion, economics and education (Dembo, 1994).

➤ ***Skinner's Operant Conditioning Mechanisms :***

- Positive Reinforcement or reward: Responses that are rewarded are likely to be repeated. (Good grades reinforce careful study.)
- Negative Reinforcement: Responses that allow escape from painful or undesirable situations are likely to be repeated.
- Extinction or Non-Reinforcement: Responses that are not reinforced are not likely to be repeated. (Ignoring student misbehavior should extinguish that behavior.)
- Punishment: Responses that bring painful or undesirable consequences will be suppressed, but may reappear if reinforcement contingencies change. {Penalizing late students by withdrawing privileges should stop their lateness.}

➤ ***Skinner and Behavioral Shaping:***

If placed in a cage an animal may take a very long time to figure out that pressing a lever will spawn food. To accomplish such behavior consecutive approximations of the behavior are rewarded until the animal learns the association between the lever and the food reward. To begin shaping, the animal may be rewarded for simply turning in the way of the lever, then for moving to the lever, for brushing against the lever, and finally for pawing the lever.

Behavioral chaining befall when a succession of steps need to be learned. The animal would master each step in series until the entire sequence is learned.

➤ **Reinforcement Schedules :**

Once the desired behavioral response is accomplished, reinforcement does not have to be 100%; in fact it can be maintained more successfully through what Skinner referred to as partial reinforcement schedules. Partial reinforcement schedules include interval schedules and ratio schedules.

- Fixed Interval Schedules: the target response is reinforced after a fixed amount of time has passed since the last reinforcement.
- Variable Interval Schedules: similar to fixed interval schedules, but the amount of time that must pass between reinforcement varies.
- Fixed Ratio Schedules: a fixed number of correct responses must occur before reinforcement may recur.
- Variable Ratio Schedules: the number of correct repetitions of the correct response for reinforcement varies.

2. Gagne's Nine Events of Instruction:

Gagne's published 'The Conditions of Learning back' in 1965, which expressed those certain mental conditions must be present in sequence for knowledge absorption and retention to occur.

He also introduced the nine events of Instruction, emerged on the internal and external cognitive factors that contribute to learning. The internal factors are the learner's before knowledge, while the external factors are outside stimuli.

➤ **The nine events are:**

1. Gain- the attention of the students with a good evidence, For example, introduce a stimulus that catches and assign their brain to get the attention of the learners(novel ideas or thought-provoking question, etc.).
2. Inform students of the objectives -Establish the expected outcomes and learning objectives very clearly to the learners and they should also be aware of the criteria for measuring achievement.
3. Stimulate recall of prior learning -Leverage the existing knowledge of the learner before submitting new knowledge and build on it which behalf to make the students familiar to the new information by narrate it to something they already know or something they have meanwhike experienced.

4. Present the content – Deliver the task in an easily consumable shred so that there is no information overload.
5. Provide learner guidance – All the learners are not experts and force require assistance at different points. If the learners feel that they are not getting exact assistance, there can be learning disengagement. Examples, case studies, and other instructional backing can be used to supplement the content.
6. Elicit performance -Engage them with various activities that recall, utilize, and evaluate knowledge to derive their performance.
7. Provide feedback -Reinforce knowledge with quick feedback (informative, remedial, corrective, etc.)
8. Assess performance -Measure their knowledge with established criteria. Assure that the learners should be well aware of these assessments.
9. Enhance retention and transfer to the job- Use content retention strategies to ensure that there is proper memory retention and make the learners apply it in the real working environment.

8.1.6.2 Cognitive and Instructional Design:

Although cognitive psychology come out in the late 1950s and began to take over as the prevalent theory of learning, it wasn't until the late 1970s that cognitive science began to have its influence on instructional design. Cognitive science began a shift from behaviorist practices which emphasized external behavior, to a concern with the internal mental processes of the mind and how they could be utilized in promoting effective learning.

The design models that had been growth in the behaviorist usage were not simply tossed out, but instead the "task analysis" and "learner analysis" virtues of the models were decorated. The new models addressed aspect processes of learning such as knowledge coding and representation, information storage and retrieval as well as the incorporation and correlation of new knowledge with prior information (Saettler,1990). Because Cognitivism and Behaviorism are both governed by an objective prospect of the nature of Knowledge and what it means to know something, the alteration from behavioral instructional design principles to those of a cognitive mode was not entirely difficult. The goal of instruction remained the communication or transfer of knowledge to learners in the most efficient, effective modesty possible (Bednar et al., in Anglin,1995).


For example, the breaking down of a motive into small steps works for a behaviorist who is trying to find the most skillful and fail proof method of shaping a learner's behavior. The cognitive scientist would analyze a task, break it down into smaller steps and use that information to develop instruction that moves from simple to complex building on before schema. The impact of cognitive science in instructional design is evidenced by the use of advance organizers, mnemonic devices, metaphors, chunking into meaningful parts and the careful organization of instructional implement from simple to complex.

➤ **Cognitivism and Computer-Based Instruction**

Computers process information in a similar fashion to how cognitive scientists confide human's process information: receive, store and retrieve. This analogy makes the possibility of programming a computer to "think" like a person conceivable, i.e. artificial intelligence.

Artificial intelligence entangle the computer working to supply appropriate reaction to student input from the computer's data base. A trouble-shooting program is one example of these programs.

➤ ***Below is a list of some programs and their intended use:***

- 
- SCHOLAR - teaches facts about South American geography in a Socratic method
 - PUFF - diagnoses medical patients for possible pulmonary disorders
 - MYCIN - diagnoses blood infections and prescribes possible treatment
 - DENDRAL - enables a chemist to make an accurate guess about the molecular structure of an unknown compound
 - META-DENDRAL - makes up its own molecular fragmentation rules in an attempt to explain sets of basic data
 - GUIDION - a derivative of the MYCIN program that gave a student information about a case and compared their diagnosis with what MYCIN would suggest
 - SOPIE - helps engineers troubleshoot electronic equipment problems
 - BUGGY - allows teachers to diagnose causes for student mathematical errors
 - LOGO - designed to help children learn to program a computer
 - Davis' math programs for the PLATO system - to encourage mathematical development through discovery(Saettler, 1990)

8.1.6.3 Constructivism theories and Implications to instructional design:

The alternative of instructional design from behaviorism to cognitivism was not as dramatic as the move into constructivism occurs to be, since behaviorism and cognitivism are both objective in nature. Behaviorism and cognitivism both support the practice of analyzing a task and infringing it down into manageable chunks, establishing objectives, and measuring performance based on those objectives. Constructivism, on the other hand, honors a more open-ended learning experience where the process and outcome of learning are not easily measured and may not be the same for each learner.

- While behaviorism and constructivism are very different theoretical perspectives, cognitivism shares some similarities with constructivism. Consider the following statement by Perkins:
- "...information processing models have spawned the computer model of the mind as an information processor. Constructivism has added that this information processor must be seen as not just shuffling data, but wielding it flexibly during learning -- making hypotheses, testing tentative interpretations, and so on." (Perkins, 1991, p.21 in Schwier, 1998).
- *Other examples of the link between cognitive theory and constructivism are:*
 - schema theory (Spiro, et al, 1991, in Schwier, 1998)
 - connectionism (Bereiter, 1991, in Schwier, 1998)
 - hypermedia (Tolhurst, 1992, in Schwier, 1998)
 - multimedia (Dede, 1992, in Schwier, 1998)
- Despite these similarities between cognitivism and constructivism, the objective side of cognitivism supported the use of models to be used in the systems approach of instructional design. Constructivism is not compatible with the present systems

- **Approach to instructional design, as Jonassen points out :**

The conundrum that constructivism poses for instructional designers, however, is that if each individual is responsible for knowledge construction, how can we as designers determine and insure a common set of outcomes for learning, as we have been taught to do?

lists the following *implications of constructivism for instructional design*: ...purposeful knowledge construction may be facilitated by learning environments which:

- Provide multiple representations of reality - avoid oversimplification of instruction by representing the natural complexity of the world
- Present authentic tasks - contextualize

- Provide real-world, case-based learning environments, rather than pre-determined instructional sequences
- Foster reflective practice
- Enable context- and content-dependent knowledge construction
- Support collaborative construction of knowledge through social negotiation, not competition among learners for recognition

Although we believe that constructivism is not a prescriptive theory of instruction, it should be possible to bargain more explicit guidelines on how to design learning environments that nourish constructivist learning.

...a constructivist design process should be concerned with designing environments which support the construction of knowledge, which ...

- Is Based on Internal Negotiation
- Is Based on Social Negotiation
- Is Facilitated by Exploration of Real World Environments and Intervention of New Environments processes that are regulated by each individual's intentions, needs, and/or expectations
- Results in Mental Models and provides Meaningful, Authentic Contexts for Learning and Using the
- Requires an Understanding of its Own Thinking Process and Problem Solving Methods
- Modeled for Learners by Skilled Performers but Not Necessarily Expert Performers
- Requires Collaboration Among Learners and With the Teacher
- Provides an Intellectual Toolkit to Facilitate an Internal Negotiation Necessary for Building Mental Models



8.1.6.2 Constructivist Theories and Implications to instructional design:

Bartlett (1932) pioneered what happen the constructivist approach (Good & Brophy, 1990). Constructivists believe that -learners construct their own reality or at least interpret it based upon their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences, mental structures, and beliefs that are used to interpret objects and events.

What someone knows is grounded in perception of the physical and social experiences which are comprehended by the mind. (Jonasson, 1991).makes the following comments:

If each person has their own prospective about reality, then how can we as a society communicate and/or coexist? Jonassen, addressing this issue in his article "*Thinking Technology: toward a Constructivist Design Model*",

- "Perhaps the most common misconception of constructivism is the inference that we each therefore construct a unique reality, that reality is only in the mind of the knower, which will doubtlessly lead to intellectual anarchy."
- "A reasonable response to that criticism is the Gibsonia perspective that contends that there exists a physical world that is subject to physical laws that we all know in pretty much the same way because those physical rule are perceivable by humans in pretty much the same way."
- "Constructivists also believe that much of reality is shared through a process of social negotiation..."

"If one query through the many philosophical and psychological theories of the past, the threads of constructivism may be put in the writing of such people as Bruner, Ulrick, Neiser, Goodman, Kant, Kuhn, Dewey and Habermas. The most profound influence was Jean Piaget's work which was interpreted and elaborate by von Glasserfield (Smorgansbord, 1997).

➤ ***The Assumptions of Constructivism – Merrill***

- knowledge is constructed from experience
- learning is a personal interpretation of the world
- learning is an active process in which meaning is developed on the basis of experience
- conceptual growth comes from the negotiation of meaning, the sharing of multiple perspectives and the changing of our internal representations through collaborative learning
- learning should be situated in realistic settings; testing should be integrated with the task and not a separate activity (Merrill, 1991, in Smorgansbord,

➤ ***Principles:***

1. Instruction must be concerned with the experiences and contexts that make the student willing and able to learn (readiness).
2. Instruction must be structured so that it can be easily grasped by the student (spiral organization).
3. Instruction should be designed to facilitate extrapolation and or fill in the gaps (going beyond the information given).

8.1.7 Relation between Learning Theory and Instructional Design:

1. Definition

Behavioral learning theory can be summarized as learning that occurs through the behavioral response to environmentally sourced stimuli

[1]. the strictures of this theory is built upon assumptions that "have little regard for the cognitive processing of the learner involved in the task"

[2]. the assumptions take into account 3 criteria:

- The instructional task is the focus of a behavior response,
- The learning occurs by the influence of environmental stimuli, and
- The learning occurs through the process of exercise of the behavior.

2. Applications In Instructional Design

Impacts of behaviorists, like Skinner and Pavlov, have jumpstarted the interest in behavioral learning theory as a means to educate. Use of the theory were presented in the 1950s through the advent of Skinner's teaching machines. The machines were comprised of a series of tasks to be completed by the learner—each designed to ensure that the tasks are completed correctly in series to move forward. The machines were inventive and based solely on eliciting a positive response in the form of a behavior.

3. Behavioral learning theory Impact on the Field Of Instructional Design

There is no doubt that learning in some instances outcome in the development of a physical skill; furthermore, the practicing of that skill will result in a response to a stimulus. The focus of behavioral learning theory resides in the use of reinforcement to drive behavior. Instructional Design can benefit from the use of reinforcement as a means to train learners to complete instructional objectives that are presented to them.

4. Cognitive learning theory Impact On The Field Of Instructional Design

With the advent of cognitive learning theory, Instructional Design expanded its scope of practice to include solutions that focus on the learner in the design process. Some Instructional Designers follow an iterative process that uses information about the learners as well as the environment to develop instructional solutions. The Instructional Designer comes up with a list of instructional goals that can now be expanded beyond just observable behavior; furthermore, using assessment tools that test the newly acquired knowledge that has been "transferred" to the learner is also available.

5. Social learning theory Impact On The Field Of Instructional Design

Social theory has left its mark on the field of instructional tasks by expanding the way that instructional solutions can be developed. With the addition of how the social aspect of the environment can influence learning, a world of instructional strategies has generated new opportunities for learning. Collaborative learning groups and the use of peer review are widely used in many settings in which learning occurs. In this way, knowledge is not just transferred to the individual, but by using a set of observable behaviors, the learner can interpret the models in a way that improves their individual understanding.

8.1.8 Instructional Strategies:

Instructional strategies are the techniques / methods that a teacher can accept to meet the different learning objectives. These strategies help students to walk on the path of independent learning and arrive strategic learners. They prepare teachers to make learning fun and help students to shake up their desire to learn. Instructional strategies hub on not only the educational content but also on the method and environment of the teaching process. Students' development level, interests and experiences are discussed while choosing a particular teaching strategy so that they can self-accomplish their goals. This pathway on classroom management strategies can help you identify which instructional strategies strength be best for your environment.



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Sub Unit-8.2. [Systemic Approach to Instruction Design]

Topic-8.2.0

8.2.1 Systemic Approach to Instruction Design:

- *Systemic*: a system may be defined as any entity conceptual or physical, which consists of interrelated, interacting or interdependent parts. In functional elements, it may be regarded separately, each from the other, but it is not independent of the environment in which it exists.

Ackoff defines a system as “A system is the set of interrelated and interdependent elements.” The Webster’s dictionary defines a system as “A regularly interacting or independent group of items forming a unified whole”

- **Systemic Approach :**

The concept ‘Systems Approach’ came into use in relation with complex man-machine system. In World War II teams of scientists were commissioned to consider the problems faced by Great Britain during the first Nazi bombings. The successes realized by these scientists, working systematically in teams both in Great Britain and America, culminated in an enthusiastic attempt to apply the same techniques to finding solutions to problems in non-military settings. The approach was introduced in industry and then expanded into non-military government, agencies. Today, scientific, systematic approach to problem solving decision-making and planning is widely used in the social service and educational professions. Today, it is used in the field of education as a strategy to manage and improve the process and products of education.

- Systems approach is a technique. Systems approach indicates systematic thinking and step by step problem solving. The purpose of the system approach is to get the best outcomes by using all available resources. The system approach is concerned with identifying goals and determining and evaluating the means for accomplishing these goals. Identifying and organizing the goals and objectives requires a clear specification of the objectives of each element in the total system in relation to terminal goals or mission of the system as a whole. It also requires prioritizing the goals and the objectives, which implement each goal.
- Bertalanffy defined that “The systems approach involves a consideration of alternative solutions and of choosing those promising optimizations at maximum efficiency and minimal cost in a complex network of interactions.

➤ **Components of a system:**

Following are the definitions of the various components of a system:

- 1) Elements or entities: The things which reflect its substantive content.
- 2) Variables: Variables are conditions of the relevant properties of these elements at given times.
- 3) Related variables: Variables which are within the system.
- 4) Parameters: Variables which are outside the system but interact with it
- 5) Full function variable: Variable has no finite internal consistency. It is in a constant state of flux.
- 6) Part function variable: It has finite interval of change and finite interval of consistency.
- 7) Stop function variable: It represents the variable with finite intervals of constant separated by instantaneous jumps.
- 8) Open system: System in contact with their environment, with input and output across system boundaries.

➤ **Stages in system approach:**

There are three stages in system approach: 1) System analysis 2) System design & development 3) System Evaluation.

1. System analysis: If the present system is defective then system analysis is the very first stage in which the present system is analyzed to obtain answers to the following questions:-

What are the elements of system? How is the organization of these elements individually or as a whole? What are inputs, outputs, resource available and constraints? How they interact within the system and the environment? What are the boundaries of the environment? What are the resources available? How is the process work? What is output?

2. System design & development:

In this stage attempts are made to design and develop a new system on the basis of findings of the system analysis. The main activities are as follows:

- The environment (context) of the system is specified.
- Objectives of the system are made clear.
- Selection criteria are fixed for selection of approaches.
- Selection of appropriate devices, methods, strategies, techniques and approaches are made.
- A scheme of comprehensive programme for the working of the system in relation to its parameters and stipulated objectives is formulated.
- System is structured and designed for a try out and evaluation.

3) System Evaluation:

The system is evaluated in terms of the stipulated objectives for providing necessary feedback. If a discrepancy still persists between objectives and outputs they are further examined and modification is carried out to meet the requirements. The modified system is then put to a large-scale try out which is followed by a summative evaluation.

➤ Advantages of system approach:

- 1) It helps for structuring and selection of media.
- 2) It provides a conceptual framework on which to build plans for implementing change in any system.
- 3) It helps to identify the suitability or otherwise of resource material to achieve the specific goal.
- 4) It helps to assess the resource needs, their sources and facilities in relation to quantities, time and other factors.
- 5) Technological advance could be used to provide integration of machines, media and people for attaining the defined goal.
- 6) It permits an orderly introduction of components demonstrated to be required for systems success in terms of outcomes.
- 7) Rigidity in plan of action is avoided as continuous evaluation affords desired beneficial changes to be made.

➤ Systems approach can be used in Education :

- 1) **Effective planning of school programmes:** Many schools do not have systematic planning of short or long range goals of Education. With the help of system approach one can translate broad educational objectives into actual assignments in terms of long range goals and specific short range objectives.
- 2) **Increased control and co-ordination:** In system approach, effective school management techniques are used to control the various components of the instructional process. Co-ordination among the different parts is exercised as a result of the achievement of specific objectives at level of operation.
- 3) **Maximum utilization of school personnel:** There is duplication of efforts in our traditional method of teaching because objectives are not especially identified by the school personnel. There is no proper utilization of human energy where objectives have not been properly delineated. Systems approach utilizes more effectively the school personnel by controlling,, coordinating and evaluating continuously the activities of all the personnel.

4) More effective methods for appraising performance: Traditionally, the method of evaluation has been more or less subjective. In systems approach, objectives are clearly defined. All educators participate in deciding objectives and action plan for their achievement.

5) Better training and development plan: Systems approach is an invaluable means for improving training and developing programmers.

6) Control of quality: The main use of systems approach in education is to improve the quality of Education.

➤ ***Instructional system:***

Instructional system consists some interactive and interrelated elements operating systematically to achieve instructional objectives. A system designed for human instruction is an instructional system. It is broader term and not limited to curriculum.



- Smith defined the instructional system as: “An instructional system is defined as an integrated set of methods, media, and equipment and personnel performing efficiently, the functions required to accomplish one or more training objectives.”
- Systems approach to instruction helps in understanding, controlling and improving the structure and functioning of the system in view of effective realization of instructional objectives. It helps in providing best possible solution to the problems related to planning, process and products of instruction.

➤ ***Stages and steps of Instructional Development System:***

- 1) *Define-objectives*: Here the skills required to achieve outcomes are identified.
- 2) *Pre-Assessment*: The levels and skills of the students are identified.
- 3) *Specify Appropriate Approaches and Methods*: The approaches and methods according to the content and level of students are selected to maximize optimum student learning.
- 4) *Select Materials and Media*: Materials and media are selected according to instructional strategies, and learning experiences are developed. Appropriate academic environment is also given.
- 5) *Define and Design Personnel Roles*: Here the programmer selects the students and defines the roles of teachers and paraprofessionals involved in the instructional system.
- 6) *Synthesize and Implement the System of Instruction*: Selected approaches, methods, media and tasks are to be integrated into systems model. The task by each variable is defined and tryout of the instructional system is carried out on the sample.
- 7) *Evaluation of outcomes*: Students' achievement is measured and examined in the light of the objectives.
- 8) *Analyze Results and Modify the System*: On the basis of feedback from the evaluation results, the system is modified for its effectiveness.

8.2.2 Models of Development of Instructional Design:

Instructional design model present guidelines to organize appropriate pedagogical scenarios to achieve instructional goals. Instructional design can be defined as the practice of constructing instructional experiences to help facilitate learning most effectively.

Driscoll & Carliner (2005) states that design is more than a process; that process, and resulting product, represent a framework of thinking. Instructional design models describe how to conduct the various steps. These steps involve instructional design process. The models help trainers and educators to guide and plan in total process.

➤ ***Characteristics of Instructional Design Models:***

According to Branch and Merrill (2002), there are several characteristics that should be present in all instructional design models:

1. Instructional design is learner centered: Learner and his/her performance are the focal point.
2. Instructional design is goal oriented: Well defined goals are essential.
3. Instructional design focuses on real world performance. Help learners perform the behaviors that will be expected of them in the real world.
4. Instructional design focuses on outcomes that can be measured in a reliable and valid way. Creating valid and reliable measurement instrument is essential.
5. Instructional design is empirical. Data are the heart of the process.
6. Instructional design typically is a team effort. This process usually involves team work

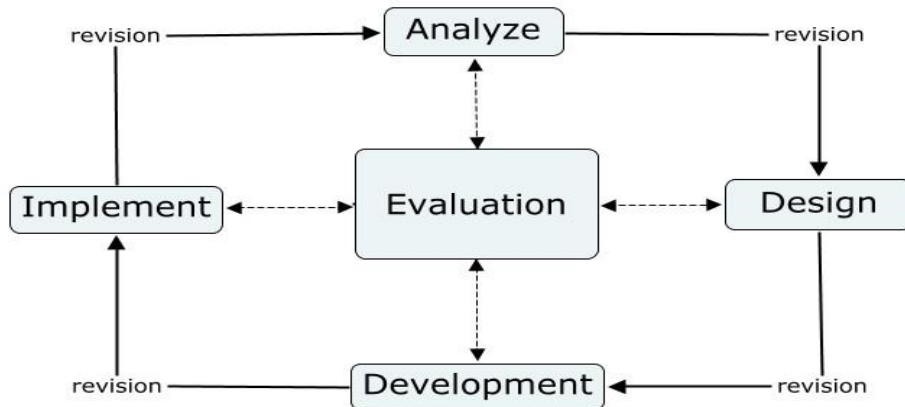
8.2.2.1 ADDIE model (Analyze, Design, Develop, Implement, and Evaluate):

The concept of Instructional Design can be drawn back to as early as the 1950s. But it wasn't until 1975 that 'ADDIE' was designed. Originally developed for the U.S. Army by the Centre for Educational Technology at Florida State University, ADDIE was later implemented crosswise all branches of the U.S. Armed Forces.

The ADDIE model was founded on an earlier ID model, the Five Step Approach, which had been developed by the U.S. Air Force. The ADDIE model maintains this five-step feature, and accessory many sub-stages within each of the five broad phases. Due to the hierarchical structure of the steps, one had to complete the process in a linear fashion, completing one phase before starting the next.

For many years now, educators and instructional designers similar have used the ADDIE Instructional Design (ID) process as a framework in designing and developing educational and training programs. "ADDIE" stands for **Analyze, Design, Develop, Implement, and Evaluate**. This sequence, however, does not induct a strict lineal progression through the steps. Educators, instructional designers and training developers discovery this approach very useful because having stages neatly defined facilitates implementation of effective training instrument. As an ID model, Addie Model has found wide acceptance and use.

➤ *The five components of the Addie Model are:*



- I. Analysis – Here the instructional designer should do the gap analysis and identify if the training is really required. In this stage, ID develops an obvious understanding of the gap that subsists between the desired result and the existing knowledge and skills of the learners.
- II. Design -In this phase, IDs select the instructional strategy to follow, write objectives, choose appropriate media and delivery methods.
- III. Development -The output from the design phase is used here to start developing the course. The pathway is released/rolled-out, delivered, to the learners, and its impact is advise.
- IV. Implementation- Once the courses are developed the next stage is the implementation of the courses on the various platforms. For example, if it's relearning, the courses are implemented on LMS.
- V. Evaluation -This stage involves taking the feedback on the courses like is the course providing the expected results? Feedbacks are essential to understand how effective the course was.

➤ *Development:*

The Development stage starts the production and testing of the methodology essence used in the project. In this stage, designers commit use of the data collected from the two priory stages, and use this information to create a program that will relay what needs to be taught to participants. If the two previous stages required planning and brainstorming, the Development stage is all about putting it into action.

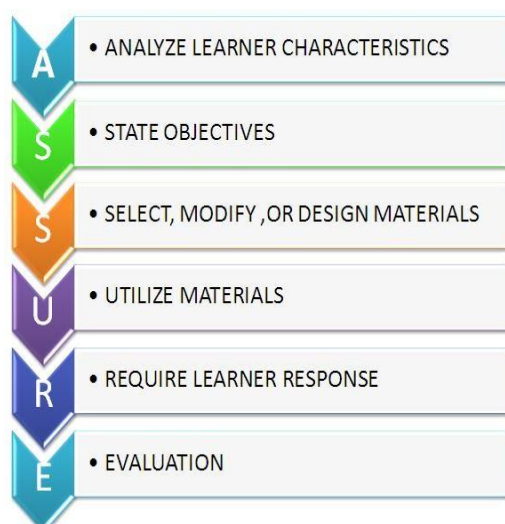
➤ *Implementation:*

The implementation stage gleam the continuous modification of the program to make certain maximum efficiency and positive results are obtained. Here is where IDs strive to redesign, update, and edit the way in order to ensure that it can be released effectively. “Procedure” is the key word here. Much of the actual work is done here as IDs and students work hand in hand to train on new instrument, so that the design can be continuously evaluated for therewithal improvement. No project should run its course in isolation and in the absence of exact evaluation from the IDs. Since this stage achive much feedback both from IDs and participants alike, much can be learned and addressed.

8.2.2.2 ASSURE Model:

The ASSURE model was founded by Heinrich and Molenda in 1999. This model is more suitable for the blended learning approach.✓

➤ *The steps in the ASSURE model are:*



1. Analysis: This stage stresses on the importance of studying the audience before designing the strategy. Learners' skills, previous knowledge, attitude, age, grade and learning style must be aching into consideration.
2. Statement of the Objectives: The objectives must be clear and sound. The Instructor must condition what the learner will gain in the end. The ID should have the clear objective of what he is trying to teach and to the learners what they are required to learn.
3. Selection of Media: Relevant media and content materials such as sound, graphics, text animations and videos must be selected for effective learning outcomes. This stage has more relevance in the eLearning industry. The mark of a good set of learning objectives is pursuance to the ABCDs of well-stated learning objectives.

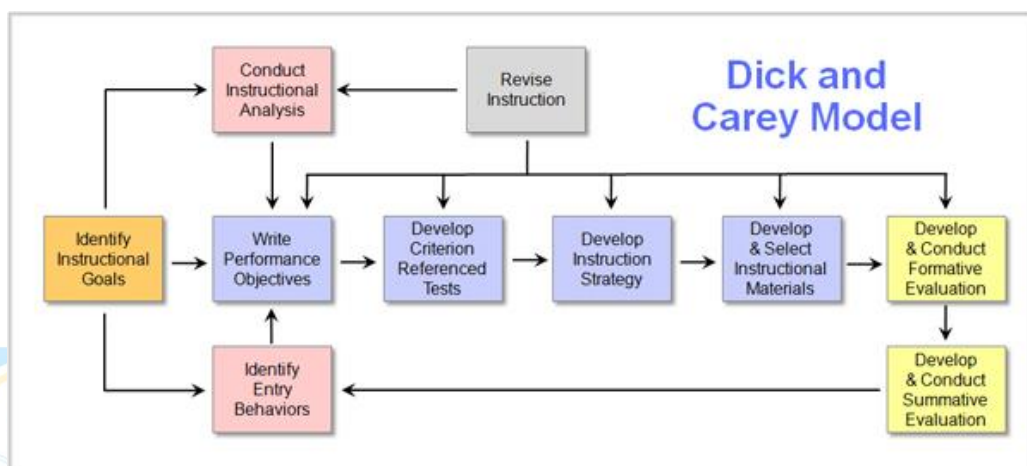
➤ They are as follows:

- Audience – For who is the objective intended?
- Behavior – What is the behavior or performance to be demonstrated?
- Conditions – What are the conditions under which the behavior or performance will be observed?
- Degree – To what degree will the knowledge or skill be mastered?

4. Utilize technology, media & materials-This step in the ASSURE process concerns making a plan as to how you will utilize the technology, media, and materials that you have selected
5. Require Learners Performance: It requires making plans to how to engage the learners in the material that you are teaching. This needs to be concrete out both at the class level and the individual level. For example, encourage participation of the students in class discussions. A more detailed approach would quest that learners ready questions and comments at home to bring into the class.
6. Evaluate and Revise: The final step in the ASSURE process is just as crucial as all of the others. In this step, you evaluate the impact of your teaching on student learning. This includes an evaluation of your teaching strategies and the technology, media, and materials that you used. The final step in your evaluation should nave on feedback from your students. Was their experience positive overall?

8.2.2.3 Dick and Carey Instructional Model:

Instructional models can vary broadly. While some may focus on how to make the lesson plans and others focus on the distribution of the content itself, the Dick and Carey instructional design model (also known as the *Systems Approach Model*) is one of the superior. Despite the seemingly complex diagrams that pop up when searching for an image (see below), the steps are hourly only connected as far as what they do to help you figure out what to teach and how to teach it. All ten steps are connected, and some influence others indirectly while they may influence others directly.



Stage -1 Instructional Goals

The first step is to figure out the instructional goals. This means that you are able to, or will be able to, identify what it is the students need to learn. For example, if you were teaching a pathway on American history, you possibly wouldn't teach a lesson on Guy Fawkes and his gunpowder plot from 1605. However, if you were teaching a class on English history, there would indeed have to be a lesson on the gunpowder plot. It all reclines on what kind of material your overarching theme is covering.

Stage 2. Instructional Analysis

Instructional analysis is the second step. This means you are determining the skills that your students will need to learn what you plan to teach them. Returning to the Guy Fawkes situation, some may need to have a love of history instilled in them before they are willing to sit down and listen to the lesson. Others may simply need to be susceptible to work on the lesson material at their own position.

Stage -3. Entry Behaviors and Learner Characteristics

Next you have to measure which skills the students have out of those that you prior determined are needed for this lesson. For the Guy Fawkes example, if you determine that they should be able to keep the date he was caught – November 5, 1605 – and someone is not good with remembering dates, you may have to help them with it. Are they able to sit still long enough? Or do they have trouble talking? These skills will be crucial to the lesson's success with each student.

Stage -4. Performance Objectives

Next, you must figure out inelastic goals and objectives for the lesson. This is the equivalent of the SWBAT – or Student Will Be Able To – that many American classrooms must have as of this writing. These objectives must be detailed – such as “the student will be able to identify the gunpowder plot's purpose”. Details will help you make sure you are teaching your students what matters most from the lesson, such as the gunpowder plot was meant to blow up Parliament.

Stage-5. Criterion-Referenced Test Items

The fifth thing you must do is to make a test (consistent with the performance objectives) that will reflect what you're expectant to teach the students. Referring back to notes you have made will favor you figure out what to test. These are meant to help the students understand what they have or have not mastered yet, and are a checkpoint for the parents or administrators.

Stage-6. Instructional Strategy

Sixth, you begin to outline your lesson plan. This same that you will be able to demonstrate what you want them to learn, add activities, and fix how each part will be done. If you want to have group activities, now are the time to settle when and what materials will be tunicateby the activity.

Stage -7. Instructional Materials

Seventh, you make assured you have what you need prepared for the lesson. If you have something you meantime know will work, use it. This could fort bringing in a barrel like the ones used in Guy Fawkes' plot, or bringing in a scale model of the Parliament building that would have been blown up.

Stage- 8. Formative Evaluation

Next, you would have to assess how the lesson went. Were there few students who weren't too thrilled with the group work? Did your groups not work well? Did some students sit back while others did all the work, waiting to ride along for a good grade? You could use this time to go for a field trip or to work in smaller groups. You could even do one on one if you have a small sufficient group.

Stage -9. Summative Evaluation

Ninth, If all you do is teach a class on the ammunition plot, you have a good opportunity to rethink the class. There will evermore be a grumbler or two, but if it works out well a majority of the time, it'd be worth keeping. If there's one activity that no class has ever liked, it would be worth chopping it out and replacing it with any else. This step is all about forfeit sure that when you resumption the teaching process, it'll work out.

8.2.3. Gagne's Nine Events of Instruction Model:

Gagne's Model This theory of learning mortgaged that learners learn in many ways. To acquire the best learning methods, we need various types of instructions. Gagne as a military research director in 1958 was not contented with theories about instructional design by his predecessors and began to formulate his own principles of learning. (Rita C. Richey 2000) observed instructional design as a two drawn in phenomenon: it is either macro design which shift overall direction on the instructional design or micro-design which provides strategies about forming lesson plan and procedure to carry out those plans. Gagne's contributions are related to the later phase.

- According to Gagne an instructor must provide adequate instruction to the learner to learn effectively. The instructor must make sure that every instruction is mastered prior going to the next level (Gagne, R. (1962). Gagne latter, classifies learning into five major types such as, verbal information, intellectual skills, cognitive strategies, motor skills and attitudes(Robert A. Reiser 2001). He points out that in series to learn effectively, different internal and external conditions are very crucial for each type of the learning.
- Robert M. Gagne in the book The Conditions of Learning (1965) described the nine steps of instruction that can be best implemented for designing the learning steps. Gagne Termed these steps, as instructional events, this linear model are like connecting blocks - one leading to the other. The steps are given below.

- In this unit you will be introduced to many of the issues to understanding and applying Gagne's Instructional Design Theory for instructional design purposes. The objectives for this unit are these:

- Differentiate between a “theory of learning” and a “theory of instructional design”
- State the antecedents and influences of Gagne's theory of instructional design
- List and provide examples of the taxonomy of learning outcomes
- List and provide examples of conditions of learning
- List and provide examples of the nine events of instruction
- State your position on the efficacy of Gagne's theory of instructional design, identifying advantages and shortcomings

➤ *Stapes of Gagne's Instructional Design:*

1. Gain Attention: In order to help the learners learn better, it is important to gain their attention. Some of the ways to grab the attention of the learners are storytelling, demonstration, presenting a challenging problem, doing something differently.

2. Inform the learner of the objectives: Informing learners about the objectives is to let them know in advance what is expected of them at the end. Also, it is a cue to the instructor to tell what he/she will tell and then tell them, and again review them at the end.

3. Stimulate recall of prior learning: Concepts, methods, processes learnt earlier and pre-requisite as to learning new concepts, methods, and processes should be recalled before new learning can occur. The instructor needs to do this by asking questions, by stating the concepts or by simply doing a review of what has been learnt so far.

4. Present the learning material: Information is presented to the learner in small chunks from simple to complex sequence.

5. Provide guidance for learning: This step is to allow the learners to comprehend and assimilate the materials presented. Thus, the instructor needs to facilitate learning by providing guiding steps.

6. Elicit performance: In this step, the instructor asks questions to elicit learners' understanding of the material presented.

7. Provide reinforcement: This is to check whether the learners' performance is correct or wrong. In this stage, specific feedback should be provided.

8. Assess performance: This step is different from step 6. Here the terminal evaluation of the achievement of objectives is done using some kind of tests.

9. Enhancing retention and transfer: Explaining this step, Aronson and Briggs (1983) say “Instructional designers cannot assume that learners will be able to transfer learning from one situation to another; such retention and transfer should be included as part of the instruction. For intellectual skills, providing spaced reviews helps.

8.2.4 Five E’s of Constructivism Model of Instruction:

In the 5 E model of instruction, students construct knowledge and meaning from their experiences. This model was developed as part of a BSCS (Biological Sciences Curriculum Study) to improve the science and health curriculum for elementary schools. The 5 E method is an example of inquiry-based learning, in which students ask questions, decide what information enhances their understanding, and then self-assess. The research showed positive results when the 5 E model was adopted by schools. Standardized tests scores showed that those students in classrooms using the BSCS science program for two years were four months ahead of students in other classrooms. According to the published report, "the sustained use of an effective, research-based instructional model can help students learn fundamental concepts in science and other domains." In this constructivist model of learning, there are five stages in learning, and each stage begins with the letter E: *engage, explore, explain, extend, and evaluate*.

1. Engage Stage:

To engage students, teachers should connect the topic or concept at hand with prior understanding. Students are encouraged to ask questions or draw on experiences. The teacher does not correct any misconceptions about the topic or concept but does make notes about revisiting these misconceptions. The objective of the engagement stage is to get students excited and prepared to explore the topic or concept.

2. Explore Stage:

Once students are interested, they can begin to manage the problems associated with the topic or concept. Students pose real questions and develop hypotheses. The key concepts in the topic are identified while teachers bargain hands-on activities. Students develop the skills that are needed to measure their ideas. The teacher does not bargain direct instruction at this time. Instead, the teacher concept students through inquiry-based questions as students work cooperatively in groups.

3. Explain Stage

Students develop explanations for what they have already observed. They define the necessary vocabulary and connect their findings to prior knowledge. The teacher should support student discussion and answer student questions. While this stage is a direct instruction phase, the discussions mean that this new information is shared collaboratively.

During this stage, students feel this information through a single example. For example, they may understand the life hoop of one species or a particular form of government. They will need the time, which is provided in the next stage, to internalize their understanding before comparing and contrasting.

4. Extend Stage

Research shows that students need to solidify their understanding by connecting what they have learned to something real. They need to move from a single example in the Explain stage to a generalization that can be applied in other examples. In applying this information, students may formulate new hypotheses. The new hypotheses can be tested in new investigations. In practicing new skills, students may take data and make new conclusions. In the investigations during the extend phase, students use the vocabulary and concepts in their discussions and their writing.

5. Evaluate Stage


In the final stage, students return to the engage phase to compare their earlier understanding of what they know now. They address any misconceptions they held, and the teacher makes sure these misconceptions are corrected. They reflect on what they know, and how they are now able to prove what they know in writing, discussion, and demonstration.

➤ *5 E Model for Social Studies*

In social studies, the 5E method can be used in a unit that addresses forms of delegate government.

- a) **Engage**: Students take a poll that asks what criteria they would like in a representative government
- b) **Explore**: Students explore different forms of representative governments including direct democracy, representative democracy, presidential democracy, parliamentary democracy, authoritarian democracy, participatory democracy, Islamic democracy, and social democracy.
- c) **Explain**: Students define terms and determine which representative government best fits the criteria from the poll.
- d) **Extend**: Students apply what they have learned about representative government to real-world examples.
- e) **Evaluate**: Students return to the information from the poll, adjust their criteria and then fashion a new form of representative government.

8.2.5 Nine Elements of Constructivist Instructional Design:

- 
- 10) **Reception** – Voice modulations, gestures, short introduction video, and handouts can be used for this purpose.
 - 11) **Expectancy**- Learners are informed about what they are about to learn so that their interest will be developed.
 - 12) **Retrieval** – Teacher must relate the new information with their prior knowledge.
 - 13) **Selective Perception** – Information should be presented in a practical and easy to understand manner depending on the needs and level of students.
 - 14) **Semantic Encoding**: Help student to learn and retain new information by use of examples, case studies, storytelling,.
 - 15) **Responding**: Students can demonstrate what they have learned through question-answer rounds.
 - 16) **Reinforcement**: It is given to the students in the form of feedback for helping them in retaining new information.
 - 17) **Retrieval**: Student's performance should be accessed through some tests.
 - 18) **Generalization**: Students should apply what they have learned to new situations and conditions, and then with practice they will be able to generalize it.

8.2.6 Application of Computers in Education:

Computers are one of the greatest valuable resources in a classroom because they distribute so many adjuvant functions. With computers and the internet, students today have a substance of information at their finger tips that can help them develop their research and communication skills while blueprint them for a future profession in a workforce that is increasingly contingent on computer technology.

8.2.6.1 Computer-Assisted Instruction:

The main navel of this report is the most commonly used and greater portion frequently researched kind of educational computer use--computer-assisted instruction (CAI). Findings about other educational computer applications are submitted as they relate to this main focus.

- CAI – Terminology As with any field of learning, acronyms abound in the computer assisted instruction/learning domain. Terms immensely in the extension of their definition, or their specificity. It shows a brief list of some of the main terms that are used in CAI related field.

CBT - *Computer Based Training*

CAI - *Computer Assisted Instruction*

CAL - *Computer Assisted Learning*

CALL - *Computer Assisted Language Learning*

WBI - *Web Based Instruction*

WBT - *Web Based Training*

- The term CAI, as the name suggests, is the use of a computer to provide instruction. The format can be form 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 Computer Interaction (HCI) amongst others.

➤ *Various Instructional Modes*

In the field of instructions, a computer performance a major role. In these computer assisted instructions, in interacts immediately with the learners while presenting lessons. The computer gives instructions directly to students and permits them to interact with the computer through the lessons programmed in the system. There are different instructional modes which can be facilities by computer assisted instruction (CAI).

1) Tutorial Mode - In tutorial information, is presented in small units followed by questions. The pupils' response is analyzed by the computer and adequate feedback is given. A network of branches or pathways can be programmed to each. The pupils are allowed to work on their own pace. The more alternative programs available to the computers, the more adaptive the tutorials can be to individual differences.

2) Drill of practice - In this mode, the program leads the learner via a series of examples to develop dexterity and fluency in using the skill. All correct reply are reinforced. Only on gain the mastery by the learner, the computer with forward further.

3) Discovery Mode – Here, inductive approach is followed. The problems are presented and the pupil solves problems through trial and error. It is just like laboratory learning. It aims at the deeper understanding of the results obtained from discovery. Hence, complex problems can be solved.

4) Gaming Mode – This mode may or may not be instructional but it is recreational. Sometimes learning takes place through games. This mode is especially meant for young children.

5) Simulation Mode – Here the pupil faces scaled down approximation of a real life situations. Hence, realistic practice takes place without involving any risk.

6) Problem Solving Mode - problem solving can be readily achieved provided the typical computational capability of the computer is available and there is a typewriter and display response device with remote control of two-way communication.

7) Inquiry Mode – Inquiry is mode of third type of CAI application. In this CAI system responds to student inquiry with answers it has stored. In this mode instructional staff must learn how the system operates.

8) Author Mode - CAI is used to support instruction by generating sets of materials for a student's use. In generating concept learning materials, these might be sentence forms which have blanks in them each of which is to be filled by a word or a set of word, i.e., inserted into the blanks by computer according to the set or instructions.

9) Logo – This system was developed by Farseeing and Paper at MIT. Logo is simple programming language which can be taught to children. This programmed provides instructions which can be used to produce picture on screen.

➤ *Role of Teacher:*

CAI has proved powerful tool for the teacher in the instructional process. Of course, there is some change in teacher's role as. CAI directly interacts with the students individually and with the teacher. Teachers are to play their role in CAI. Human teachers cannot be eliminated from teaching-learning process. We can highlight the role of a teacher in CAI in the following manner -



- Use of New Tools: CAI provides the teacher some chance
- To use new tools. This use will enhance the person's satisfaction. Also it will increase the individual's efficiency. The CAI can compute accurately and rapidly amounts of data. It can produce elaborate graphs and drawings.
- Compatible with Line Teaching: CAI is compatible with line teaching. It can be used side by side. CAI is flexible system of instructions. It can very promptly evaluate the performance of individual student. The teacher can devote his time for more creative activities.

➤ *Limitations of CAI :*

1. *Experts Needed in CAI* - Compute aided instructions need the help of the following experts - i) Computer Engineer – A computer engineer is a technical person and knows about basic principles and techniques of programming.
2. *Lesson Writer* - The lesson writer is an expert who is familiar with lesson writing. Lesson writers may be experienced teachers or an experienced teacher may be a lesson writer. He knows theories of learning.
3. *System Operator* – He knows the system thoroughly and can cope with all commonly thoroughly and can cope with all commonly occurring failures of software and hardware in the system.
4. The computer fails to appreciate the emotions of students. The emotional climate created by teacher in direct class room interaction with the students is absent in CAI.

5. CAI programs do not in themselves solve psychological or educational problems. Computer programmers of conventional type do not work like human beings at all.
6. CAI fails to develop essential features of language competency where the ability to generate or construct meaningful sentences is essential.
7. It was pointed out that some students got more tired than conventional study or felt like quitting the study.
8. CAI cannot appreciate the student's artistic endeavor and cannot strengthen his friendship and deepen his perception of those around him.
9. The peripheral equipment puts constraints in the ways on which a student can interact with the computer.

8.2.6.2 Computer Based Training:

This course is founded on CBT technology and includes the use of a multimedia platform on tablets. Its aim is to provide in-depth knowledge on Drilled systems. The pathway uses PDF technical documents, video-animation and 3D content. If the course is held at Drilled SPA (Italy), in collation to the multimedia component on CBT, training meetings can further be organized with expert personnel, so as to achieve practical experience on the single components. The CBT course employs a hierarchical structure to measure the level of learning achieved by personnel. The process includes a test at the end of each learning unit which, upon a positive result, gives entry to the next topic. Each student will be provided with a user name and password in order to be able to verify, through a software manager, their progress in learning and to provide the client with final feedback on each participant.

➤ *CBT for mariners are courses which:*

1. Are used by students without the need for assistance by instructors.
2. Have built in assessment and produce registers of the training time and the student identification.
3. Are interactive.
4. Use multimedia technology.
5. Are run on remain alone PCs, networked computers, the Internet, or corporate Intranets.
6. Are run overboard ship or at shore side locations.

- However, Eldridge, (2000, p. 2.3) defines CBT as: ... simply another means of delivering good quality training. If we treat it as a separate issue, we are in danger of giving it more than deserves.

- CBT Structure Methodologies (Models): Training is an important issue in the maritime field and may be carried out in schools, onboard ships, or at the trainee's home by using CBT programs. Below the author presents five CBT structure methodologies (tutorials, drills, simulation, games, and assessment), any one of which could be used in training with standalone PC
 - Tutorials : Tutorials aim to deliver information, skills and guidelines through the initial use of information and skills (Alessi & Trollip, 1991).
 - Drills: The computerized drill is a methodology used primarily for trainee practices for retention and fluency of the training process.
 - Simulation: As the trainee becomes increasingly competent in dealing with the simple case, the simulation then adds details to bring the trainee close to the reality.
 - Games: Games are similar to simulation, to a great extent, as both provide an environment that facilitates training and the acquisition of skills. Moreover, their effectiveness is based on Introductory Section Present information Question and Response.
 - Assessment: Assessment is used for many purposes, including the determination of a learner's knowledge (what he/she knows, and what he/she does not), and ranks learners in order in terms of performance, language level and others. CBT is used for assessing individual achievement against the agreed competency standard (the outcomes required in the workplace) in many countries.

- *The role of CBT in the Current Development of Education Methodologies:*
 - CBT as a Textbook
 - Computer-Based Knowledge Management (CBKM)
 - Computer Simulation
 - CBT in Distance Education
 - Teaching Tools
 - Learning about and from Computer
 - Using Computers by Students & Teachers

8.2.6.3 Computer Managed Learning (CML):

The development of microcomputers (personal computers) provided a much less expensive mode of computer application, which in turn, served to heighten the excitement concerning the use of computers to enhance instruction in schools. However, computers are and continue to be tools that are able to store and manipulate data at incredible speeds, and the initial 1 application of computers centered on number crunching and data storage. The military, followed by business, soon took advantage of this technology (Wager, 1985). The utilization of computers in education to store, sort, and display data has been considered and applied but not with near the zeal as has CAL. Computer-managed learning (CMI), nevertheless, is a significant application of computer technology. As the perceived needs for accountability and documentation of student progress grow so too will the usefulness of computers as electronic filing, sorting, and reporting systems.

- Computer-managed learning is not to be confused with computer-assisted instruction (CAI), computer-assisted learning (CAL), computer-based instruction (CBI), or computer-based learning (CBL). It is, however, often referred to as computer-managed instruction (CMI). When discussing computers and education, if one remembers that learning and instruction generally refer to the same thing, a good deal of the confusion between different terms is often eliminated.
- CMI refers to the following definition: CMI in its most sophisticated levels provides the following instructional functions. (1) Assesses the learner's present level of knowledge, (2) diagnoses weakness or gaps in the student's learning, (3) prescribes learning activities to remediate the identified weaknesses, and continuously monitors progress of the learner. (Mitzel, 1982)
- According to Splittgerber and Stirzaker, CML is defined as: ... an instructional management application utilizing the computer to direct the entire instructional process, including format as well as the traditional forms of instruction which do not require computers, for example, lectures and group activities (Splittgerber & Stirzaker, 198~, p. 38).

- Because CML can save time, money, and bureaucratic headaches, special educators are likely to continue developing and using microcomputer management tools for:
 - Recording, monitoring, and reporting student progress.
 - Listing incomplete information on student records.
 - Recording contacts with parents and supporting agencies/personnel.
 - Generating reports on referrals, meetings, evaluation, placement, programming and review for each student.
 - Locating, describing, and recommending appropriate materials based on individual student needs.
 - Generating IEP objectives from a large data base and
 - Issuing reminders for when reports are due. (Griffith-Sheriff and Walter, 1981, p. 3)
- *Computer Managed Instruction (CMI) program was developed by the author, which had the following features:*
 - (1) Self-pacing. Course of study was divided into seven units, and within the time frame of one academic quarter, students were free to complete the units at their own rate,
 - (2) Mastery Learning. A minimum performance of 80 percent correct responses was required for each unit of work,
 - (3) Individual differences. Materials were developed for each unit which served as supplementary readings for students who were not able to meet the 80 percent mastery level. For the few students who continued to experience difficulty, individual conferences were scheduled with the instructor,
 - (4) Self - teaching. Students were not told which of their answers were correct or incorrect, but were furnished feedback at the completion of each session in terms of the number of correct responses emitted per topic,
 - (5) Record keeping. Summaries of each student's status were available to instructor at any time through the computer terminal.

8.2.7 ODLM (Open and Distance Learning Material):

8.2.7.1 Concept of ODL:

There is no one definition of open and distance learning. Rather, there are many prospective to defining the terminology. Greater portion definitions, however, pay attention to the following characteristics:

- Detachment of teacher and learner in time or place, or in both time and place;
 - Institutional accreditation; that is, learning is entrusted or certified by some institution or delegacy. This type of learning is distinct from learning with your own effort without the official recognition of a learning institution;
 - Use of mixed-media courseware, with print, radio, and television broadcasts, video and audio cassettes, computer-based learning, and telecommunications. Courseware tends to be pre-tested and affirm before use;
 - Two-way communication assumes learners and tutors to interact as prominent from the passive receipt of broadcast signals. Communication can be synchronous or asynchronous;
 - Probability of face-to-face meetings for tutorials, learner–learner interaction, library study, and laboratory or practice sessions; and
 - Use of industrialized processes; that is, in large-scale open and distance learning operations, labor is divided and suites are assigned to several staff who works together in course development teams.
- Systems approach to open and distance learning A systems approach sets the conditions for proceeding in an orderly way. A systems approach also recognizes that all the components of the system are interrelated. A change in one aspect will bring about changes in the others. Open and distance learning programmers, units, and institutions use a phased model for problem solving:

[Analyze → Design → Develop → Implement → Evaluate → Revise]

- Functions of open and distance learning Regardless of the size of the programmed, unit, or institution undertaking development and implementation of an open and distance learning system, the following functions must occur at some level. Rich considerations in relation to each open and distance learning content are listed following.

- Obtaining and managing money and other resources
- Developing or acquiring programmers and courses
- Recruiting and promoting
- Physically producing, reproducing, storing, and disseminating materials
- Enrolling and registering
- Delivering programmers and courses
- Providing learner support
- Examining, crediting, and granting credentials
- Evaluating and revising processes, procedures, programmers, and courses
- Training and developing staff

- *Advantages of open and distance learning:*



- Overcoming physical distance
- Solving time or scheduling problems
- Expanding the limited number of places available
- Making best use of the limited number of teachers available
- Dealing with cultural, religious, and political considerations

8.2.7.2 Process of ODLM:

Sound instructional design is simply good teaching. Good teachers tend to follow similar guidelines. Do your participants agree with the following list?

❖ *Preliminary considerations Before they begin a lesson, good teachers consider:*

- The likely abilities of their learners;
- Their learners' level of education;
- Their present level of knowledge;
- Their social and cultural background; and
- Their motivation and interest.

❖ *Defining tasks On that basis, good teachers then define:*

- Their learners' ultimate overall task;
- The major components of this task;
- The conditions under which each component task will be performed; and
- The level of performance that is desired for each task.

❖ *Task analysis Good teachers then analyze each component task:*

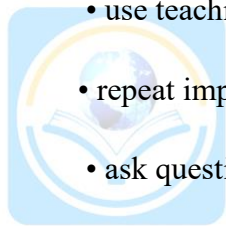
- deleting the tasks that learners can perform already;
- selecting the most important and critical tasks; and
- stating what learners will be able to do as a result of the lesson.

❖ *Structuring the lesson For a lesson to be effective, the teacher should:*

- share the objectives of the lesson with the learners; and
- teach in logical order, using a lesson outline like the following

❖ *During the lesson While teaching, good teachers remember to:*

- communicate clearly;
- organize well;
- link past and present learning;
- encourage learners to participate;
- provide practice and opportunities for practice;
- avoid monotony;
- use emphasis;
- demonstrate their own interest;
- use teaching aids effectively;
- repeat important points;
- ask questions; and
- remain flexible.



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❖ *Approaches an instructional designer is not advised to take with the subject specialist:*

- Outside consultant;
- Process expert;
- Paternalist (spoon-feeding the subject specialist)
- Colonialist (encouraging the subject specialist but never giving her independence);
- Proselytizer (preaching values to the subject specialist);
- Instructor (regarding the subject specialist as a pupil);
- Reeder of subject specialist defects;
- Prescriber of teaching methods for particular subject areas; and
- Client-centered counselor.

❖ *Strategies for materials Course materials in open and distance learning programmes can be provided in three ways:*

1. Adopt existing materials; Text with Technology
2. Adapt existing materials; or
3. Create original materials.

These strategies are set out in the tables on the following pages, together with the benefits they offer, their limitations, and other factors that might affect decision-making. These strategies form a continuum, with adoption at one end, creation at the other, and adaptation somewhere in the middle.

8.2.8 e- learning:

8.2.8.1 Concept of e learning: E-learning has proved to be the best means in the corporate sector, especially when training programs are conducted by MNCs for professionals across the globe and employees are efficient to acquire important skills while sitting in a board room, or by having seminars, which are guided for employees of the same or the different organizations under one roof. The schools which use E-learning technologies are a step fore of those which still have the traditional approach to learning.

A learning process based on enacts teaching but with the help of electronic component is known as E-learning. While teaching can be based in or out of the classrooms, the use of computers and the Internet forms the major component of E-learning. E-learning can also be termed as a network enabled transfer of skills and knowledge, and the allotment of education is made to a large number of acceptor at the same or different times. Earlier, it was not accepted wholeheartedly as it was assumed that this system need the human element required in learning.

E-learning or "electronic learning" is an umbrella term that narrated education using electronic devices and digital media. It encompasses everything from traditional classrooms that discrete basic technology to online universities.

E-learning in a traditional setting may comprise educational films and PowerPoint presentations. These forms of media can provide students with content that is farther dynamic and engaging than textbooks and a whiteboard. Edutainment, or content that is designed to be educational and entertaining, may be used to repose students' attention while providing knowledge about a particular topic.

➤ ***The History of eLearning:***

To better understand how eLearning benefits organizations today, it's helpful to look at its past. Elliott Maisie coined the term "eLearning" in 1999, marking the first time the phrase was used professionally. In the years since, e learning's reputation has gone from strength to strength. But what part has facilitated eLearning in becoming the portion popular way to deliver training today?

➤ ***Some of these factors include:***

- *The Internet* - Prior to the rise of the internet, many relied on printed manuals, CD-ROMS and other restrictive methods for learning and training. The rise of the internet allowed organizations to abandon one-dimensional practices and utilize the flexibility of eLearning.
- *Development of Multimedia* - As eLearning progressed, the ability to integrate elements such as images, videos, audio and graphics proved to be a more reliable way of keeping learners engaged compared to traditional learning.
- *Affordable Digital Devices* - Considering the first IBM computer cost the equivalent of almost \$5000 today, it's understandable that eLearning popularity rose as digital devices became more affordable. Mobile learning also hugely facilitated the growth of eLearning.
- *Well-Built Learning Management Systems* - LMS's have become more sophisticated, moving from locally installed to cloud-based systems, with organizations increasingly applying them to execute many forms of training. There are many things to consider when choosing an LMS; at a minimum ensure it has the functionality and support you need to meet your objectives and those of your learners.

8.2.8.2 Approaches to e learning:

E-learning has a numerously of definitions, possibly because there isn't a single type of e learning. A general definition exhibition the "learning" made by means of web technologies, or through an preinstalled software in a computer with multimedia retention, either in an asynchronic way (separated student and source on time: auto formation), or in a synchronic way (connected student and source in real time, a "virtual class ").

8.2.8.2.1 Offline:

Offline learning refers to situations where the program is not operating and taking in new information in real time. Instead, it has a fixed set of input data. The opposite is online learning, where the machine learning program is working in actual time on data that comes in.

Offline learning is sometimes narrated as a proactive type of learning that can work oncoming on the basis of evaluating the static data sets that it has at its settlement. Because there is no continual influence of information, the program and its human propeller can benchmark the outcome of the training set and apply them to future phases of operation.

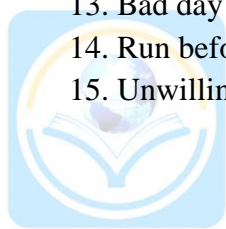
With offline learning, it's easier to ensure attendees are paying attention to the training. Some learners also find it easier to keep the knowledge and skills they've learnt through offline training than they do with online training.

➤ ***The advantages of offline learning***

- i. The process of learning is not isolated.
- ii. There is an instructor or a teacher present at all times to answer the student's queries
- iii. Exchange of ideas and views in offline classrooms is "real-time" and effective.
- iv. Probability of learning is high.
- v. Any doubts and problems can be solved immediately.
- vi. The true form of learning is where there is involvement of people sharing and receiving knowledge without delay.
- vii. Evolves some super qualities which may help you in future jobs like copy paste job, type writing. (kidding)
- viii. Builds your communication & managing abilities.
- ix. Helps you to outstand situations.
- x. Makes you more focused, as you have no other option than doing it. (Kudos to 75% attendance).
- xi. Evolves you as a social person
- xii. You learn something new each day
- xiii. You may get a chance to meet some really awesome faculties, who will help you with the journey.
- xiv. Practical's & Chances of correction

➤ *Disadvantages of offline learning:*

1. It is not completely an independent way of learning.
2. The students tend to be overly dependent on the teacher for every detail.
3. Travel expenses, accommodations etc must be taken care of, if the student hails from a place where there is no school or educational institution.
4. The learning is confined to fixed timings. It can only occur between the classroom's timings.
5. Chances of exploring more and finding things out for themselves from the students is limited.
6. 75% Attendance
7. Morning classes.
8. 8am to 5pm classes. This makes me struggle for self study hours.
9. Forced & boring lectures
10. Notes, Assignments, Records, Presentations
11. Mid terms, Surprise tests, Semesters.
12. Zero concern of faculties about the chap.
13. Bad day if your best friend is on leave.
14. Run before teachers for exam related questions, marks & others.
15. Unwillingly attending classes.



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8.2.8.2.2 Online:

Online learning is education that takes place upon the Internet. It is often mentioned as “e learning” among other terms. However, online learning is exactly one type of “distance learning” - the *umbrella* term for any learning that takes place across distance and not in a traditional classroom. Distance learning has a long history and there are different types available today, including:

- Correspondence Courses: conducted with regular mail by little interaction.
- Tele- courses: where content is released via radio or television broadcast.
- CD-ROM Courses: where the student interacts with constant computer content.
- Online Learning: Internet-based courses given synchronously and/or asynchronously.
- Mobile Learning: by means of devices such as cellular phones, PDAs and digital audio players (iPods, MP3 players).

➤ *Advantages of M learning:*

1. *Lower Logistics*

Traditional (offline) training often requires corporate gymnastics. You may have to shut down the office for a week and pay for everyone to look the seminar, which is not necessarily the best for close-bodied corporate budgets. Or you might need to separate them into "training shifts" which could multiply costs even therewithal. Accommodation, venue rental, food, and transport are all expenses you can eliminate by take measures online training. More importantly, you won't have to synchronize everybody's schedule into a single online training window. It's easier for employees too, because off-site training generate additional challenges, like day-care, pick-up or babysitting.

2. *Anytime-Anywhere Accessibility*

Another benefit to consider when weighing online versus offline training is greater accessibility. Traditional training is usually isolated to one location, whereas online learning gives employees the power to access mobile support tools from any geographical locale. Then there are the perks provided by the other "offline" approach. Many Learning Management Systems now feature apps and downloadable content support, which means that your employees can get the information they need without an internet connection. As a result, they have more confidence in the workplace and can mitigate risks. For example, they can quickly watch videos or tutorials that show them how to complete a task, instead of struggling through it and making expensive mistakes.

3. Increased Confidence

Some of the smartest, most talented and most successful people in the world still battle imposter syndrome. They can discreetly access JIT resources. Nobody has to know, not even the client or the boss. Of course, your IT team will know, because they review course analytics. And they've been keeping your company's tech "secrets" longer than you think, so your team's camouflaged insecurities are safe. In addition, an LMS with a mobile app or offline access allows you to gather more relevant data. For example, employees can report informal learning activities to receive credit, thereby giving you the chance to track their offline participation rates and develop online training activities that suit their needs.

4. Enhanced Personalization

Aside from group work sessions—which are ever fruitful—traditional training is a blanket affair. Courses are guided by a lecturer without the scope to monitor individual employees. They can't even really measure knowledge transfer. Online training is sometimes said to be superfluous isolating. But from a training perspective, it's easier to track corporate learners. You can see which units they're struggling with, how fast they finish, and/or when they lose interest. This exposition you which areas of your eLearning course you need to improve. You can identify and efficiency online training courses for individual employees' specifications. It ensures they all get maximum benefits from their eLearning course.

5. Expanded Variety

A seminar will generally cover a single topic. There may be sub-topics, but its nature sake you can only focus on one subject area. And because of the expense and corporate breakdown involved, training opportunities are limited. Small companies might do it once a month. With larger ones, it could be once a year. Online training can return hundreds of eLearning courses that can be discussed at the employee's leisure. And they don't have to train during work hours.

6. Greater Work-Life Balance

We tend to focus on the "mobile" aspects of online learning. But this portable quality has other advantages, too. You can study with your kids. You'll all gather at the kitchen table, and they'll do their homework while you do yours. These are favor you don't get from off-site seminars. In this sense, eLearning could become a tool for occupation progression coupled with family bonding, giving your employees the ability to achieve a better work-life balance, which improves in total satisfaction.

8.2.8.2.3 Synchronous:

Synchronous e-learning entangle online studies through chat and videoconferencing. This type of learning tool is real-time. It is like a virtual classroom that allows students to ask, and teachers to answer questions instantly, through trice messaging, which is why it is called synchronous. Rather than taking lessons alone, students attending themselves with synchronous e learning software or online courses can easily interact with fellow students and their teachers during the course.

Synchronous tools, like chats or audio conferences, provide higher social presence. For instance, in virtual classrooms, learners can use chats to offer comments and answer questions in time the presentation.

Example of Synchronous:

- a) Chat and IM,
- b) Video and audio conference ,
- c) Live webcasting ,
- d) Application sharing ,
- e) Whiteboard ,
- f) Polling



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8.2.8.2.4 Asynchronous:

Asynchronous learning can be conducted out even while the student is offline. Asynchronous e-learning involves coursework delivered via web, email and message boards that are then posted on online forums. In such cases, students ideally complete the course at their own pace, by using the internet merely as a support tool rather than volunteering exclusively for e-learning software or online interactive classes.

Asynchronous tools, such as forums and wikis, are more appropriate for tasks that require reflection and more time to realize. Asynchronous discussions are especially valuable where learners are too shy or lack language facility to collaborate effectively in real time converges.

Example of asynchronous-

- a) *E-mail*
- b) *Discussion forum*
- c) *Wiki*
- d) *Blog*
- e) *Webcasting*

8.2.8.2.5 Blended learning:

Blended learning is a term increasingly used to narrate the way e-learning is being combined with traditional classroom methods and independent study to make a new, **hybrid teaching** methodology. It represents a much greater change in basic technique than simply adding computers to classrooms; it illustrate, in many event, a basic change in the way teachers and students approach the learning experience. It has already created an offshoot – the flipped classroom – that has quickly become a distinct approach of its own.

- *Components blended learning* : There is a general consensus among education innovators that blended learning has three primary components:
- In-person classroom activities facilitated by a trained educator.
 - Online learning materials, often including pre-recorded lectures given by that same instructor.
 - Structured independent study time guided by the material in the lectures and skills developed during the classroom experience.

➤ *Facilitators focus on four key areas:*

- Development of online and offline course content.
- Facilitation of communication with and among students, including the pedagogy of communicating content online without the contextual clues students would get in person.
- Guiding the learning experience of individual students, and customizing material wherever possible to strengthen the learning experience.
- Assessment and grading, not unlike the expectations for teachers within the traditional framework.

8.2.8.2.6 Mobile learning:

Mobile learning also named M-learning, m-Learning is any type of content that is developed on mobile devices, such as Smartphone and tablets, and including anything from to full eLearning courses. If searching for just-in-time information or taking a formal learning course, this type of various mobile interaction isn't out of the common today's workforce. More than ever, people are weaving learning into their daily functions and require cross-device accessibility. Therefore, it is essential that organizations shift their learning ecosystems to adapt to the modern learning landscape, take measures the right information at the exact point of need.

➤ *Characterization of M-learning:*

- It can get access to information and educational experience faster than other media.
- It is supported by portable devices; its mobility makes it easy to use.
- Comparing to other methods of learning, the cost of M-learning is relatively low.
- Exchange of information can be encrypt.

➤ *Advantages of Mobile Learning*

- **Convenient:** Information is easily accessible and not limited to any one place or time
- **Engaging:** Content interactions can be personalized to facilitate motivation and engagement
- **Collaborative:** Learners can communicate through online communities, such as forums and chats

- **Bite-size**: Smaller content and digestible chunks of information help prevent cognitive overload
- **Accessible**: The classroom is everywhere and modern workforce is dispersed, allowing for a wider reach
- **Cost Effective**: Existing content can be leveraged and reused

➤ ***Benefits of Mobile Learning***

- Relatively inexpensive opportunities, as the cost of mobile devices are significantly less than PCs and laptops
- Multimedia content delivery and creation options
- Continuous and situated learning support
- Decrease in training costs
- Potentially a more rewarding learning experience
- New opportunities for traditional educational institutions
- Readily available a/synchronous learning experience
- Decrease in textbook costs
- Access to personalized content
- Remote access to knowledge
- Improved literacy levels

➤ ***Challenges of Mobile Learning:***

A. Technical challenges

- Connectivity and battery life
- Screen size and key size
- Meeting required bandwidth for nonstop/fast streaming
- Number of file/asset formats supported by a specific device
- Content security or copyright issue from authoring group
- Multiple standards, multiple screen sizes, multiple operating systems
- Reworking existing E-Learning materials for mobile platforms
- Limited memory
- Risk of sudden obsolescence
- Security
- Work/life balance
- Cost of investment

B. Social and educational challenges:

- Accessibility and cost barriers for end users digital divide.
- How to assess learning outside the classroom
- How to support learning across many contexts
- Content's security or copyright infringement issues
- Frequent changes in device models/technologies/functionality etc.
- Developing an appropriate theory of learning for the mobile age
- Conceptual differences between e-learning and m-learning
- Design of technology to support a lifetime of learning
- Tracking of results and proper use of this information
- No restriction on learning timetable
- Personal and private information and content
- No demographic boundary
- Disruption of students' personal and academic lives
- Access to and use of the technology in developing countries



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Sub Unit-8.3. [Emerging Trends in e learning]

Topic-8.3.0

8.3. Emerging Trends in e learning:


E-learning or Online education helps people get access to a world-class learning experience when traditional higher education may not be possible due to financial, personal or any other constraints. In countries like India there is a large requirement of e-learning to receive its form completely. India is second largest populated country in the world. The strength of any country is its people and India has the population of 134 cores i.e., 1.34 billion. One of the best places in the world to use these latest e-learning trends is country like India. Today India is a home of many latest e-learning trends in education that are being used by the developed countries from a very long period. Some of the outgoing trends of learning in India are:

- Distance education - Postal, Radio, TV
 - E-Learning
 - Open Educational Resources (OER)
 - Cloud based E-Learning
 - Big Data in E-Learning
 - Automated Course Authoring
 - Responsive LMS
 - Ubiquitous Learning
 - Massive Open Online Courses
-
- a. Distance education - Postal, Radio,
 - b. TV E-Learning
 - c. Open Educational Resources (OER)
 - d. Cloud based E-Learning
 - e. Big Data in E-Learning
 - f. Automated Course Authoring
 - g. Responsive LMS
 - h. Ubiquitous Learning
 - i. Massive Open Online Courses

8.3.1 Social learning:

Social learning theory is a theory of learning process and social behavior which proposes that new behaviors can be acquired by observing and imitating others. It states that learning is a cognitive process that takes place in a social behalf and can occur purely through observation or direct instruction, even in the default of motor reproduction or direct reinforcement. In addition to the observation of behavior, learning also ensue through the observation of rewards and punishments, a process known as different reinforcement. When a particular behavior is rewarded regularly, it will most likely insist; conversely, if a particular behavior is constantly punished, it will most likely desist. The theory expands on traditional behavioral theories, in which behavior is governed solely by reinforcements, by placing characteristic on the important roles of different internal processes in the learning individual.

Social learning is based on a theory developed by psychologist Albert Bandura that move learning is a cognitive process that takes place in a social context and occurs purely through observation or straight instruction, even in the absence of motor reproduction or direct reinforcement.

- 
- a) Facebook: It creates a space for students to ask and answer questions. When students get home and begin working on their homework, they can post a question to the groups so as to get it answered by the group member. It is also ideal for teachers using in flipped classroom. Post videos, photos, documents, and other resources on the group's wall and student can access before class or when they work on their assignments.
 - b) Twitter: Twitter offers a quick way to post class announcements and reminders as well as real time information on class field trips. It also helps classes track information on any topic. For instance, for a class discussing on a current event or a topic on career, twitter can provide up to date information, eliminating the need for extensive research.
 - c) Blogs: Instead of traditional writing projects, blogs creates opportunities for students to write and display their writings on a large scale
 - d) YouTube: It is like a Facebook, YouTube is an excellent option of flipping classroom in that students can watch lectures and resources before entering the classroom. Again, like blogging, since the components will be seen by a wider audience, students will be more apt to do their very best in making a video, and they will enjoy being able to express their creativity as they connect more deeply with the course material.

- e) Instagram: A picture is worth thousand words". Instagram can showcase student work by offering a place to peculiarity student hard work or even interesting details about a student.
- f) Google Docs: It is a popular technology with teachers and students. Students and teachers can use these tools to collaborate on assignments, projects, newsletters among other things.
- g) Wikis: which have capability to promote and facilitate „common creation“ through joining academic ventures.
- h) Social bookmarking: is used to enable users for collating, tagging, and sharing websites of their interests.

8.3.1.1 Web 2.0:

Web 1.0 is a metonym referring to the 1st stage of the World Wide Web's(www) evolution, from roughly 1991 to 2004. According to Commode and Krishnamurthy, content creators were few in Web 1.0 with the vast majority of users simply affectation as consumers of content. Personal web pages were common, consisting mainly of static pages hosted on ISP-run web servers, or on free web hosting services such as Velocities. With Web 2.0, it became usual for average web users to have social-networking profiles and personal blogs with either a low-cost web hosting service or through a dedicated host (like Blogger or LiveJournal). In general, content was generated dynamically, allowing readers to comment directly on pages in a way that was not common prior. The term "Web 2.0" was coined by Darcy DiNucci, an information architecture consultant, in her January 1999 article "Fragmented Future"

- **Web 2.0** is the business revolution in the computer industry caused by the move to the internet as a platform, and any attempt to understand the rules for success on that new platform.-Tim O' Reilly.
- **Web 2.0 can be described in three parts:**
 - Rich Internet application (RIA) — defines the experience brought from desktop to browser, whether it is "rich" from a graphical point of view or a usability/interactivity or features point of view.

- Web-oriented architecture (WOA) — defines how Web 2.0 applications expose their functionality so that other applications can leverage and integrate the functionality providing a set of much richer applications.
- Social Web — defines how Web 2.0 websites tend to interact much more with the end user and make the end user an integral part of the website, either by adding his or her profile, adding comments on content, uploading new content, or adding user-generated content (e.g., personal digital photos).

➤ *Web 2.0 sites include the following features and techniques*



- Search-Finding information through keyword search.
- Links to other websites-Connects information sources together using the model of the Web.
- Authoring-The ability to create and update content leads to the collaborative work of many authors. Wiki users may extend, undo, redo and edit each other's work. Comment systems allow readers to contribute their viewpoints.
- Tags-Categorization of content by users adding "tags" — short, usually one-word or two-word descriptions — to facilitate searching. For instant, a user can tag a metal song as "death metal". Collections of tags made by many users within a single system may be referred to as "folksonomies" (i.e., folk taxonomies).
- Extensions-Software that makes the Web an application platform as well as a document server. Examples accessory Adobe Reader, Adobe Flash, Microsoft Silverlight, ActiveX, Oracle Java, QuickTime, and Windows Media.
- Signals-The use of syndication technology, such as RSS feeds to notify users of content changes.

➤ *Advantages of Web 2.0:*

- Available at any time, any place.
- Variety of media.
- Ease of usage.
- Learners can actively be involved in knowledge building.
- Can create dynamic learning communities.
- Everybody is the author and the editor, every edit that has been made can be tracked.
- User-friendly.
- Updates in the wiki are immediate and it offers more sources for researchers.
- It provides real-time discussion.

8.3.1.2 Social networking:

Social networking is the use of Internet-based social media sites to stay associated with friends, family, colleagues, customers, or clients. Social networking can have a social purpose, a business purpose, or both, through sites such as Facebook, Twitter, LinkedIn, and Instagram, among others. Social networking has suitable a significant base for marketers seeking to assign customers. A social networking service (also social networking site or social media) is an online stage which people use to build social networks or social relationship with other people who share similar personal or career interests, activities, grounding or real-life connections.

The Bolt.com social networking website was created in 1996, by Jane Mount and Dan Pelson. Although it is not deliberated the first true social media website, it technically was the first to be created. It was officially shut down in October 2008.

A social network is defined as a chain of individuals and their personal connections. Expanding one's connections with other people is a technique that can be used both for personal or business thought. Social networking applications commit use of the associations between individuals to therewithal facilitate the creation of new connections with other people. This could be used to meet new friends and connect with old ones, as many people do on Facebook, or to expand one's professional connections through a business network like LinkedIn

➤ *Uses of Social Networking:*

- To **stay in touch** with what friends are doing
- To **stay up-to-date** with news and current events
- To **fill up spare time**
- To **find funny or entertaining content**
- **General networking** with other people
- Because friends are already on them
- To **share photos or videos** with others
- To **share my opinion**
- To **research new products to buy**
- To **meet new people**

8.3.1.3 Blogs:

A blog (shortening of “weblog”) is an online journal or informational website demonstration information in the reverse chronological order, with the latest posts blooming first. Also, blogs with how-to manuals began to appear. Founded institutions began to note the difference between journalism and blogging. The number of bloggers in the United States is set to reach 31.7 million users in 2020. A frequent, chronological publication of personal thinking and Web links. The word “blog” is a shortened version of *web logs* or *weblogs*. Besides being shorter and catchier, “blog” seems less likely to cause confusion, as “web log” can also mean a server’s log files.

➤ *Blogging*

Blogging is the set of muktiole skills that one needs to run and control a blog. Equipping web page with tools to make the process of writing, posting, linking, and sharing content easier on the internet’s a platform where a writer or even a group of writers share their opinion on an individual subject.

➤ *Blog structure*

The presence of blogs changed over time, and nowadays blogs comprise different items. But, most blogs include some valuable features and structure. Here are common fervidity that a typical blog will include:

- Header with the menu or navigation bar
- Main content area with highlighted or latest blog posts
- Sidebar with social profiles, favorite content, or call-to-action
- Footer with relevant links like a disclaimer, privacy policy, contact page, etc

➤ *Blogging Tools*

These are the basic blogging tools we use and at marketingterms.com

Domain Name – Namecheap

WordPress Hosting – WP Engine

Content Management – WordPress

(WordPress) Theme – Astra

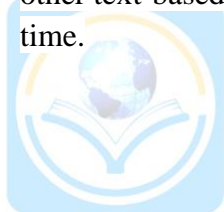
(WordPress) Page Builder – Elementor

8.3.1.4 Chats:

Chat may be delivered by text, verbal, audio, visual or audio-visual (A/V) communication via the Internet. If directed through a desktop, chat requires software that supports Internet Relay Chat (IRC) or an eyewink messenger application, where a central server manages chat communication between different end user clients.

Online chat may note to any kind of communication over the Internet that award a real-time transmission of text messages from sender to receiver. Chat messages are usually short in order to enable other participants to respond quickly. Thereby, a feeling similar to a spoken conversation is made, which distinguishes chatting from other text-based online communication forms such as Internet forums and email. Online chat may address point-to-point communications as well as multicast communications from one sender to many receivers and voice and video chat, or may be a feature of a web conferencing service.

Chat is a text-based communication that is live or in real-time. For instant, when talking to someone in chat any category text is received by other participants immediately. In contrast, other text-based communications like as e-mail are modes of correspondence that are not real-time.



8.3.1.5 Video Conferencing:

Video conferencing is a technology that assumes users in different locations to hold face-to-face meetings without having to step to a single location together. This technology is particularly convenient for business users in different cities or even different countries because it saves time, expenses, and hassles connected with business travel. Uses for video conferencing with holding routine meetings, negotiating business deals, and interviewing job candidates.

A video conference is a live, visual connection between two or more people laying in separate locations for the objectives of communication. Video conferencing is a speedily growing technology as it helps businesses in cost reduction, faster client interaction, conducting and joining video conferences from someplace anytime etc. Tools like R-HUB HD video conferencing servers, Polycom, Avaya, WebEx etc. are commonly used by companies in series to conduct online video conferences.



➤ *Uses of Video Conferencing-*

- Video conferencing can also be used as a medium for conducting training, with the instructor teaching a remote class from almost anywhere.
- This can be done in a corporate context, especially for getting workers the knowledge they need to better perform their jobs. The academic world can also make use of video conferencing to connect a traditional classroom setting with students who based a considerable distance from the school.
- A video conference may also be used to conduct regular meetings with a company staff or to confer with shareholders about the latest activities at the business.
- It may be used to announce significant changes at a company, such as introducing a new CEO or to present information in an interactive way that allows all participants to engage in discussion about what they see on screen.
- Hotels and conference centers sometimes make video conferencing services available to guests who require such services. This may be offered in suites or conference rooms that have been equipped for this purpose.

8.3.1.6 Discussion forum:

Discussion forums are possibly the earliest form of social media platform. Formerly adopters of Internet technology may recall news groups or special interest groups (SIGs) that were hosted on the early websites and systems connected to the Internet. These communities were profound in technical topics but eventually expanded to cover exactly about any category that could draw an audience. These platforms matured and are now hosted on consumer-oriented social networking sites.

Discussion forums are especially valuable from a analytic standpoint as they are highly focused in their content and provide a candid view of the topic being discussed. The content is mostly unstructured in nature but contains different social data types that can be leveraged into better endeavor decision workflows. Flyertalk.com is an excellent example of a discussion-driven community, which hosts conversation centric to the airline industry. Topics include frequent-flyer forums, travel news, luxury hotel converse, and advice on all things airline related.

A website that provides an online exchange of information between people about a particular topic. It shifts a venue for questions and answers and may be advised to rephrase the content appropriate. Further called a "discussion board" or "discussion group," an Internet forum is analogous to an Internet newsgroup, but uses the Web browser for access. Before the Web, text-only forums were common on bulletin boards and proprietary online services.

➤ *Uses of Discussion Forum-*

- Engage students in active learning.
- Promotes growth for collaborative learning communities.
- Learner's queries are posted and responded.
- Provides flexibility to students.
- They can use it anywhere and anytime.
- It promotes real time collaborations.
- Build an online learning community.
- Increase the engagement of learning.

8.3.2 Open Education Resources:

The idea of open educational resources (OER) has many working definitions. The term was first coined at UNESCO's 2002 Forum on Open Courseware and designates "teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been exempt under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. Open licensing is created within the existing framework of intellectual property rights as defined by pertinent international conventions and respects the authorship of the work". Often cited is the William and Flora Hewlett Foundation term which defines OER as:

Teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any more tools, materials, or techniques used to support access to knowledge.

- The new definition explicitly states that OER can include both digital and non-digital resources. Also, it lists various types of use that OER permit, inspired by 5R activities of OER.

5R activities were founded by David Wiley, which include:

- Retain - the right to make, own, and control copies of the content (e.g., download, duplicate, store, and manage)
- Reuse - the right to use the content in a wide range of ways (e.g., in a class, in a study group, on a website, in a video)
- Revise - the right to adapt, adjust, modify, or alter the content itself (e.g., translate the content into another language)
- Remix - the right to combine the original or revised content with other material to create something new (e.g., incorporate the content into a mash up)
- Redistribute - the right to share copies of the original content, your revisions, or your remixes with others (e.g., give a copy of the content to a friend)

➤ ***Advantages of using OER include:***

- *Expanded access to learning* – can be accessed anywhere at any time
- *Ability to modify course materials* – can be narrowed down to topics that are relevant to course
- *Enhancement of course material* – texts, images and videos can be used to support different learning styles
- *Rapid dissemination of information* – textbooks can be put forward quicker online than publishing a textbook
- *Cost saving for students* – all readings are available online, which saves students hundreds of dollars

➤ ***Disadvantages of using OER include:***

- *Quality/reliability concerns* – some online material can be edited by anyone at anytime, which results in irrelevant or inaccurate information
- *Limitation of copyright property protection* – OER licenses change "All rights reserved." into "Some rights reserved.", so that content creators must be careful about what materials they make available
- *Technology issues* – some students may have difficulty accessing online resources because of slow internet connection, or may not have access to the software required to use the materials.

8.3.2.1 Creative Common:

(CC) is an internationally active non-profit organization (NGO) that provides free licenses for author to use when making their work available to the public. These licenses help the creator to give permission for others to use the work in progress under certain conditions. CC licenses assume the creator of the work to select how they want others to use the work. When a creator releases their work under a CC license, members of the public know what they can and can't do with the work. This means that they only need to search the creator's permission when they want to use the work in a course not permitted by the license.

➤ *User rights*

Every CC licence allows you to:

- Copy the work (eg. download, upload, photocopy and scan the work);
- Distribute the work (eg. provide copies of the work to teachers, students, parents and the community);
- Display or perform the work
- Communicate the work
- Format shift verbatim copies of the work.

➤ *Teachers and CC*

Although teachers can hinge on statutory licenses and education exceptions set out in the Australian Copyright Act to copy and communicate material, there is very restrictive commandment dictating when a teacher is able to:

- Copy an entire work or large portions of a work;
- Modify and remix a work; and/or
- Make the work available to parents and the community.

➤ *Students and CC*

Students can also favor from using CC material in their class and homework tasks. Students copy and communicate material under the fair dealing provisions in the Copyright Act. These provisions are complex, making it difficult for a student to:

1. Copy an entire work or large portions of a work;
2. Modify and remix a work; and/or
3. Make the work available to parents and the community.

8.3.2.2 Massive Open Online Courses:

Traditional colleges and universities are facing a number of issues, including increasing number of students for the degree course, insufficient physical infrastructure, delay in admission, difficulty to adopt CBCS, inadequate faculty, increasing cost of education, reduced state for recruitment of faculty, and increasing competition from for-profit institutions. While these concerns are being addressed in various ways by different institutions, a relatively new technology — Massive Open Online Courses, or MOOCs— is increasingly being discussed as, an option that could deliver higher education materials to hundreds of millions of people at potentially lower costs.

➤ *MOOC Characteristics*

A MOOC (massive open online course) is an online course with the option of free and open registration, a publicly shared curriculum, and open-ended outcomes (Chen, 2014). Following characteristics of MOOC are narrated by Wulf, Blohm, Leimeister & Brenner (2014); Chen(2014); Gaebel (2013); Siemens (2013).



- Large number of participants (Massive):
- Open accessibility (Open):
- Digitization (Online):
- Pedagogical concepts (Course)
- Faculty members in these courses serve as a coach or mentor in addition to guiding learners to embrace social media practices.

➤ *Types of MOOC:*

- a. xMOOCs: xMOOCs fall into the cognitive-behaviorist pedagogy category(Liyanagunawardena, Adams, & Williams, 2013). It takes a more traditional approach to learning, with videotaped lectures, online quizzes and weekly assignments.
- b. cMOOCs: cMOOCs fall into the connectives pedagogy category(Liyanagunawardena, Adams, & Williams, 2013). In cMOOCs the learner's freedom, peer-to-peer learning and social networking are emphasized (Rodriguez, 2013).
- c. Quasi-MOOCs: quasi-MOOCs provide Web-based tutorials as OER(Open Educational Resources), such as those of the Khan Academy and MIT's Open Course Ware (OCW). These are technically not courses.

➤ **Benefits of MOOC:**

- Reduce educational cost: MOOCs appear more cost-effective than online courses (Hollands & Tirthali, 2014). Through the systematic use of social interaction mechanisms, such as peer support or peer grading, value activities traditionally carried out by providers of educational services are systematically sourced to MOOC participants.
- Global audience: MOOCs is open to any person who has access to the Internet. It provides free online courses and makes higher education accessible to a global audience.
- Support lifelong learning: MOOCs is a great mechanism for lifelong learning, and users range from teenagers to retirees. Learners take MOOCs for the purpose of gaining an understanding of the subject matter, increasing social experience and intellectual stimulation, taking advantage of the convenience, overcoming barriers to traditional education options and exploring online education.

8.3.3 E- inclusion:

The e-inclusion problem is so both the lack of inclusive ICT, i.e. an information society that has barriers due to the technology itself, as well as the lack of contributing with ICT to advancing economic and social inclusion in common.

8.3.3.1 Concept of E inclusion:

E-inclusion is a social movement whose objective is to end the digital divide, a term used to narrate the fact that the world can be divided into people who do and people who don't have entry to - and the capability to use - modern information technology (IT). According to advocates, e-inclusion has the strength to: close the gap between developed and less developed countries; develop democracy and mutual understanding; and entitle disadvantaged individuals, such as the poor, the disabled, and the unemployed.

- According to Hewlett-Packard, the need of their e-inclusion initiative is "... to close the gap between the technology-empowered communities and the technology-excluded communities on our planet by making it profitable to do so." The company's program is targeting low-income areas in the developing world to improve opportunities for education, healthcare, and employment and deliver access to world markets and consumer credit.

- Main aspects of e-inclusion: E-inclusion related policy and research activities can take many different forms: from full-fledged policy programs or policy statements to grassroots initiatives, from basic research projects and technology development to market implementation studies.
- Inclusive online services. The spread of ICT into all spheres of everyday life results in an increasing pervasiveness of online services: e-government, e-health, e-learning, e-commerce, etc. The emergence of these services lends a new urgency to the question of access and the digital divide as described above.
 - E-services for social inclusion. The understanding nowadays is that the information society is not all risks, but rather something that offers a number of opportunities or even clear-cut benefits for societal at-risk groups.
 - Independent living. The concept of independent living seems, at first glance, to be rather self explanatory. In general terms it describes all measures, technologies or activities helping older people and people with disabilities to live as self determined or independent as possible.



8.3.3.2 Application of assistive technology in E inclusion:

It is a broad concept covering everything that might be used to compensate for lack of certain abilities ranging from low-tech devices, like crutches or a special grip for a pen to more advanced items, like hearing aids and glasses, to high-tech devices, such as broilers and computers with specialized software's for helping dyslectics to read. Some other assistive devices for different categories of disability are discussed below-

- Computer screen magnification descriptive video services, screen readers, Braille, scanning software, independent text reading, audio devices and Braille note takers.
- Personal frequency modulation, Infrared systems, Infrared Loop systems, Text Telephones, Computerized Speech Recognition, and Closed captioned TV.
- Augmentative and Alternative Communication, First words, picture exchange communication system, Hand held or computer electronic speech devices.

8.3.5 Quality of e learning: E-learning as a term refers to a variety of different forms of technology-supported learning, usually characterized as the application of knowledge, information and educational technology to link people to one another and / or with educational resources, for the objectives of education (formal or informal) (Ehlers & Hilera, 2012). Quality in e-learning is understood in two contexts: "quality through e-learning", which refers to the quality of education in general by means of the use of e-learning tools; the quality of e-learning itself that is the subject of improving the quality of e-learning as like, is the second one. (Teodora et al., 2013)

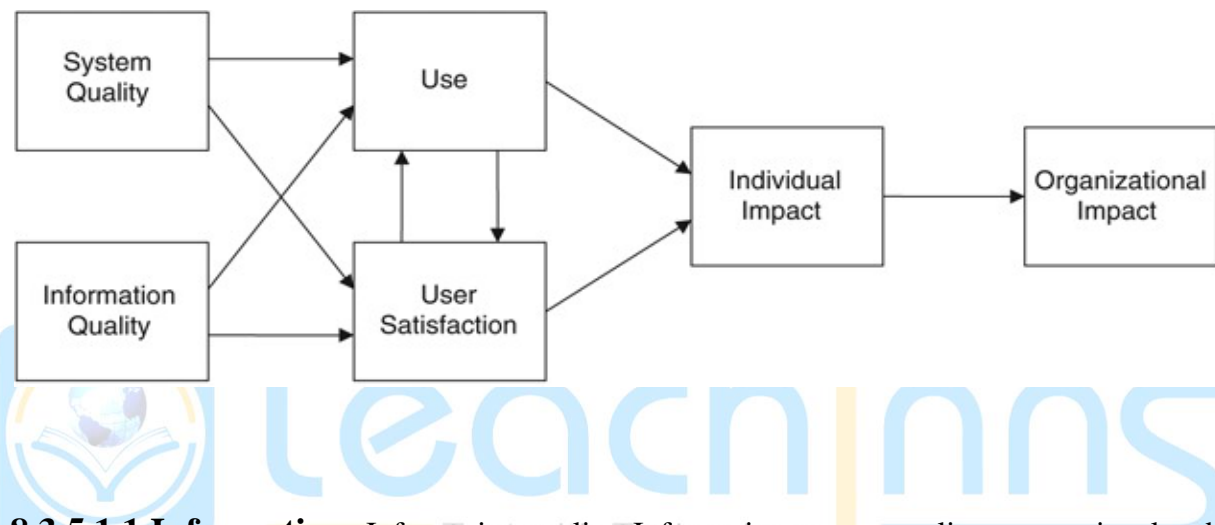
Auvinen and Peltonen (cited in Dobre, 2012). Indicate that the quality of education can be defined from three perspectives: technological, economic and pedagogical. The quality standards were associated with particular outcomes in the past. This meant that quality was evaluated on the base of courses quality and pre-defined learning outcomes. This approach changed in recent years. According to Bremer (Bremer, 2012), process-oriented approaches began to prevail. This means that not only the output, but also the quality of the entire process is subject to evaluation.

Their et al. (Thair, Garnett, & King, 2006) defined the quality in the context of higher education as a following combination of organization activities:

- Improving core activities (teaching, research and institution services)
- Alignment of activities, budget and resources with the strategic plan
- Demonstration of leadership and innovation in all activities
- Exploration of the needs of students, other customers, stakeholders and the market
- Investing in human resource development
- Use of data, information
- Improving outcomes

8.3.5.1 Measuring Quality of system:

(D and M IS Success Model, 2003): DeLone and McLean (2003) introduced an update to their IS success model. The main changes concerned quality, and service quality was included in the model. Actually DeLone and McLean (2003, 23) note: As discussed earlier, quality has three major dimensions: information quality, systems quality and service quality. They also added 'Intention to Use' to the model. At last, they withdrawn 'Individual Impact' and 'Organizational Impact' and replaced them with 'Net Benefits'; further, they added feedback loops to 'Intention to Use' and 'User Satisfaction'



8.3.5.1.1 Information: Information quality: Information system quality concept is related to system output that is useful for business users. States: “The most important informational insufficiency the managers suffer from is plenty of irrelevant information”. Information quality problems, such as incorrect information due to program or data errors and irrelevant information arise due to changed user requirements. Some important dimensions studied under Information quality like relevance, understandability, accuracy, conciseness, completeness, up to date, timeliness, and usability. According to information quality refers to the ability to acquire information that is sufficient, that meets end-user needs, and is comprehensive in nature. Security found in his empirical study that Emery (1971) suggested measuring system characteristics like the content of database, aggregation of details, human factors, response time, and system accuracy. Many researchers in different studies have measured information quality and the most common measures were of timeliness, completeness, ease of understanding, relevance, security consistency, accuracy and personalization, importance, usefulness, readability etc.

Use: A term 'Use' is defined as the recipient's consumption of the output of an information system. Use of Information system and information is very important dimension in IS success. The success dimension use represents the degree and manner in which an IS is utilized by its users. Use of Information is closely related with consumption of the output of an information system. This measured in terms of amount of use, nature of use, appropriateness of use, extent of use, actual use, daily use and frequency of use

8.3.5.1.2 System: System quality: According to the term quality means excellence, value, conformity to specification, and quality meeting customer expectation. The value of information system can be realized by improving profit margins for the organization, providing easy-to-use and useful applications, and designing easily maintainable system. Thus system quality is an important aspect in IS success. Measures of the system quality usefulness, user-friendly interface, ease of use and response time. Access and retrieval of information when needed, to meet work demands and to return requests quickly have been noted to be inherent to system quality.

8.3.5.1.3 Service: Service Quality: The success dimension, service quality represents the quality of the support that the users receive from the IS department and IT support personnel. Organizational success is delivered by the service provider. On time and error free performance by IS unit improves organizational efficiency. IS services will become better aligned with organizational goals, resulting in improved quality of decision making and improved profitability, better expectancy of customer demands and more accurate sales forecasting. Some of the dimensions are measured by most of the researchers in their work like Assurance, Empathy Flexibility, Interpersonal quality, intrinsic quality, IS training, Reliability, Responsiveness.

➤ ***SERVQUAL instrument items include:***

- "IS has up-to-date hardware and software- (tangible);
- "IS is dependable- (reliability);
- "IS employees give prompt service to users-(responsiveness);
- "IS employees have the knowledge to do their job well- (assurance); and
- "IS has users' best interests at heart- (empathy).

8.3.5.1.4 User Satisfaction: User Satisfaction: User satisfaction defined as the recipient's response to the use of the output of an information system. Found that user satisfaction is dependent variable. Found that user satisfaction closely related with user attitude; therefore, studies which include user satisfaction as a success measure should ideally also include measures of user attitudes. States that user satisfaction can be measured indirectly through information quality, system quality, and other variables.

8.3.5.1.5 Net Benefits: Net benefits effective use of information system contributes to the success of individuals, groups or organizational profits. says that net benefits is the most important construct since it captures the balance of positive and negative impacts of the ecommerce on customers, suppliers, employees, organizations, markets, industries, economies, and even societies. Measured net benefits individual level that is Learning, Awareness, Decision effectiveness, Individual productivity and organizational level Organizational costs, Staff requirements, e-Government, Business process change, improved outcomes/outputs, increased capacity, Cost reduction, Overall productivity. Net Benefits means improve decision-making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, creation of jobs, and economic develop.

8.3.6 Ethical Issues of e learning and teaching: We tend to think of net business in terms of commercial companies—the production and exchange of goods over the Internet, but education is also a growing net enterprise. In the United States, for instance, online education or eLearning is the fastest develop sector of the higher education industry. All of the ethical fix that net businesses must face are also solve by online educational programs with at least two major additions: First, the e-Learning provider is faced with a host of moral challenges concerned to the quality of the learning outcomes; and second, the e-Learning consumer faces a difference of moral challenges related to engaging in the learning process.

➤ ***Ethical Issues for the e-Learner:***

According to a U. S. National Institute of Justice report on the ethical challenges innate in the use of information technology in education, there is a new event described as “psychological distance” (Savin, 1992). In interacting with others face-to-face we get immediate feedback on unduitable and unethical behaviors, also if it is as subtle as body language. In using information technology in a way that could injury to others, the act feels less personal because we can't see or hear the other person in the exchange. The report goes on to note that traditionally moral values were learned at home and usually recovered in school. We cannot count on that today. Values are not being learned at home and schools are often restricted in their nature teaching social values. Our young people are becoming psychologically distant in their interactions with others.

This psychological distance has occupy a prevalence of academic fraud both in the way e-Learning resources are applied to the traditional learning setting and in the eLearning system itself. R. A. Fass, in a study for the American Council on Education, narrate early patterns of unsuitable behavior in e-Learning. Fass identified the following categories of academic deception in the eLearning environment:

- Inappropriate assistance on examinations.
- Misuse of sources on papers and projects.
- Writing assistance and other inappropriate tutoring.
- Misrepresentation in the collection and reporting of data.
- Improper use of academic resources.
- Disrespecting the work of others.
- Lack of protection for human subjects in research.
- Breaches of computer ethics.
- Lack of adherence to copyright and copy-protection iBiz2008 Workshop for Net Business Ethics, February 10 and 11, 2008.
- Providing inappropriate assistance to others
- Lack of adherence to academic regulations

Ethical Issues for the e Teacher:

In addressing the constellation of issues on the other side of the eLearning equation, it is important to remember that the reference to “e Teacher” here is used in the wide sense—its true meaning is the eLearning provider. While there are certainly ethical issues that are addressed by the real teacher in an eLearning environment, there are remote more faced by the institution that is oblation the eLearning opportunity. Using the term e Teacher highlights the fact that even eLearning is fundamentally based on a human relationship, albeit a new kind of teacher-learner connection with different patterns of interaction and association.

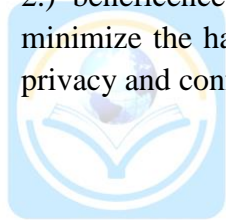
Certainly the most important moral challenge for the e Teacher is maintaining the quality of the educational process. As our primary example (above) indicates, there is nothing that lawfully prevents the offering of illegitimate degree programs that have no implicit educational value. In the end this is a moral issue. It is true that accreditation system are aimed at assisting both the provider and the consumer is sorting by these complex problems related to the minimum quality of educational offerings. But even accreditation becomes a highly complicated issue for the e Learner as offerings cross accreditation and even international boundaries. A related but distinct ethical issue for the e Teacher is full disclosure of academic regulations and standards for e Learners. With a completely different platform of interaction between e Learner and e Teacher, the provider must be attentive to new ways of transmitting information and assuring genuine communication. Simply publishing the academic catalog on a website may not be enough. In the process of all communication, the e Teacher must assure that it is the actual e Learner who is in communication and that no academic fraud is being committed. This is no different from the traditional teacher-learner relationship; it is just much more complex when the relationship is at a distance.

- Education providers have always been faced with the challenge of providing appropriate learning resources, but for the e Teacher a whole new layer of educational infrastructure must be addressed if the e Learning environment is to be fully effective.
- Not only are books and learning equipment important, but providing a reliable network infrastructure with effective learning software becomes absolutely critical.
- With that come network security and safety issues, which have genuine ethical implications. Further, a range of duplication and copyright policies must be in place to protect against “softlifting” and illegal use of electronic resources.

- The computer software instruction should discuss software licensing and limited warranty agreements and should include terminology of computer software ethics. This brings us to a broad range of ethical issues related to research. Certainly one of the most significant new opportunities for academic fraud stems from undocumented or poorly documented use of on-line sources.
- E Teachers must be attentive to educating e Learners regarding the ethical use of Internet resources. There are also a host of ethical implications regarding the use of human subjects in Internet-based research.
- Frankel and Siang (1999) have provided a basic protocol related to the ethical and legal implications of human subject research on the Internet.
- They provide two basic principles for conducting research of human subjects on the Internet:

1.) autonomy—all subjects are to be treated with respect as autonomous agents; and

2.) beneficence—researchers are obligated to maximize the benefits of the research and minimize the harms and risks to the subjects, including informed consent and protection of privacy and confidentiality.



teachinns
Text with Technology


Sub Unit-8.4. [Use of ICT in Evaluation, Administration and Research]

Topic-8.4.0

8.4. Use of ICT in Evaluation, Administration and Research:

“Information and Communications Technologies (ICTs) are a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. Communication and the information are at the very heart of the educational system, consequently ICT-use in education has a long history. ICT has played an educational role in formal and non-formal settings, in programs provided by governmental agencies, public and private educational institutions, for profit-corporations and non-profit groups, and secular and religious communities.”(unesco.org).

I. Use of ICT in Evaluation:



The introduction of Information and Communication Technologies (ICTs) in mainstream societies affects the way in which the societies interact, communicate, produce, assess, adapt and access vast amount of information at reduced costs. ICTs are not just about technologies, they are more about information transfer and communication. While poor countries grapple with the problem of high investment costs, it is widely acknowledged that convergence of ‘old’ and ‘new’ ICTs is still pertinent to poor communities, which lack basic infrastructure such as road, water, electricity and telephones. However, there are arguments that with the rapid expansion of these technologies in the western world, the gap between the poor and the rich is widening. It in future depends on a high level of ICT capability from its people if it is to develop technologically and compete internationally. As speculated in this paper ICT has the potential of promoting jobs and entrepreneurship, improving lives of women, and pay subscription towards the socio-economic development of the country as a whole. Amongst the ICTs computers are the most preferred because they have positive effects on learning and are motivating to learners.

- Computer based concept mapping with automated scoring can be used for summative assessment of critical and creative thinking about complex relationships.
- The use of ICT can help teachers by storing and recording information about how students are developing understanding of new material; and by taking over some of the role of measuring and providing feedback to students so that teachers can focus on other material of supporting learning.

- Feedback from the computer during the use of test material improves student performance in later use of the same test material.
- Several studies showed that interacting with a computer provides feedback that supports better performance even if this only reflects back to the students the moves and links they made in a visual representation of relationships.
- Use of computers to assess teamwork did not provide evidence that aspects of collaboration result in increased problem solving (as measured by computer-based knowledge mapping).
- Using technology probed students' understanding to a greater degree than conventional tests.
- Automated collection and scoring of the processes used in problem solving provided additional information relevant to problem-solving performance.
- Using a computer program both to test and give feedback to students can increase the level of performance as compared with students taking the same tests on paper.
- Use of a computer program involving diagrammatic representation provided useful information about students' causal reasoning thinking through analysis of their diagrams, but not from the log files of their computer moves.
- Computers were shown to provide information about processes in reaching a solution that gives additional feedback to students and teachers.
- Students' experience with computers and attitude towards them can influence computer-based test performance.
- A conventional multiple-choice test gave a false impression of understanding compared with the analysis of multimedia presentations on the same topic.
- Subject matter used in computer assessment of problem solving affected the outcome for girls more than boys.
- The performance of middle-school students was not improved by training in the use of computer graphics aimed at helping them make meaning of new material.
- There was conflicting evidence from two studies relating to the impact on performance of using the web to search for information.

II. Use of ICT in Administration :

Information administration in this context refers to activities relating to the management of higher education institutions which is often mentioned in other studies as managerial activities in higher education institutions. The administrative process includes Personnel administration, student administration, resources administration, financial administration and general administration (Christiana Maki, 2008). Based on the literature review the three major functional areas of information administration that are of great importance for day-to-day management of higher education institutions was identified as follows:

- Student administration
- Staff administration
- General administration

1. Student Administration

- Usage of electronic media by students to apply for admissions
- Usage of computers for student registration / enrolment
- Availability of timetable / class schedule in electronic form
- Usage of computers for maintenance of attendance of students
- Communication of academic details of students to their parents / guardians through e-media
- Usage of e-media for notifications regarding hostel accommodation
- Usage of e-media for notifications regarding transportation

2. Staff Administration

- Usage of computers for recruitment and work allotment of staff in the institution
- Automation of attendance and leave management of staff members in the institution
- Usage of electronic media for performance appraisal
- Communication with staff using
- e-media e-circulars from the institution regarding official matters
- e-kiosks are available in the institution

3. General Administrations

- Usage of e-media for scheduling / allocation of halls for examinations
- Dissemination of information in the institution through e-kiosks
- Usage of e-media by students to apply for university examinations
- Usage of e-media for the processing and display of results of students
- Facility for students to make fee payments electronic.

III. Use of ICT in Research:

The most straight forward use of ICTs in research is in data processing and analysis. The unprecedented develop in bandwidth and computing power provide(PPT) opportunities for analyzing/processing huge amounts of data and performing and achieving complex computations on them in a way that is extremely fast, accurate and reliable. Computer data processing not only frees researchers from the difficult task of manually analyzing data but more importantly facilitates quick and accurate analysis of large amounts of data from national samples or even multi-national specimen covering tens of thousands of respondents. Another important dimension of ICTs in research is the use of online full text databases and online research libraries/virtual libraries which are the direct outcome of the develop in telecommunications networks and technology. These databases and libraries bargain researchers with online view to the contents of hundreds of thousands of books from major publishing houses, research reports, and peer- reviewed articles in electric journals.

- ICT had effects on many facets of social science research. They can be classified into three categories which include: a) ICT application in pre-data analysis, b) ICT application in data analysis, and c) ICT application in post data analysis. ICT application in pre-data analysis reference to examples how ICTs are applied on activities of social science research before propagate the stage of data analysis. ICT application in pre-data analysis includes:

- i. Article Availability
- ii. Thesis and Dissertation Availability
- iii. Literature Search
- iv. Content Search
- v. Literature Tracking
- vi. Quantitative Data Collection
- vii. Qualitative Data Collection
- viii. Big Data and Its Analytics

- ICT helps researcher in the following research-related tasks-
 - Identify research areas & identify appropriate information sources through searching various online portal
 - Literature survey & critically analyses known information for further reading
 - use the information to extend and communicate knowledge across subject area fields with wide community
 - Choose Methods for research (Q&Q)
 - Data Collection – manage information/data collectively
 - Referencing
 - Present / share / disseminate Instantaneous information exchange despite geographical distances, cost less accumulation of data and documents
 - Search multiple databases and electronic resources simultaneously
 - retrieve results in a common format to consume
 - link to others individual databases for more specialized searching &
 - select favourite resources and e-journals, save searches and records, and set up email alerts.

➤ ***Application of ICT in research, Tools & Services for Research***

There are thousands of digital tools for researchers to help you through your journey to find an interesting fact. Covering details of every tool is wide the scope of this article. We have covered most important ICT products which helps you in exploring the literature, content curtain, share data and code, connect with others, tools required for data collection & evaluation, writing and publishing the paper.

1. Search Engine & Research Papers

Google/Bing/Yahoo and many other search engines help you to find useful and relevant contents. This also helps you to explore the millions of thesis and already published articles and keeps you up to date with the latest happenings in your area of interest.

Following are important *Online Tools* to explore millions of research article view the globe.

- **Google Scholar** – Provides a way to broadly search for scholarly literature across disciplines and sources.
- **Microsoft Academic Search** – Find information about academic papers, authors, conferences, journals, and organizations from multiple sources.

- ***Science scope*** – Innovation in the exploration of papers and authors.
- ***Research Gate*** – Research Gate is the professional network for scientists and researchers. Over 15 million members from totally the world use it to share, discover, and discuss research.
- ***Biohunter*** – Portal with literature search, data statistics, reading, sorting, storing, field expert identification and journal finder.
- ***edu*** -is a platform for academics to share research papers. The company's mission is to accelerate the world's research.
- ***SSRN*** – Multi-disciplinary online repository of scholarly research and related materials in social sciences.
- ***Deceptive***- provides simple and affordable access to millions of articles across thousands of peer-reviewed journals. Content from the world's direction publishers including Reed Elsevier, Springer, Wiley-Blackwell, and exceeding.
- ***Wiki Journal Club*** – Open, user-reviewed summaries of the top studies in medical research.

2. Shared Dataset & Code

- ***DataBank***– Analysis and visualization tool that contains collections of time series data on a variety of topics.
- ***Google***- Google periodically releases data of interest to researchers in a wide range of computer science disciplines.
- ***GitHub***– Online software project hosting using the Git revision control system.
- ***Open Science Framework***– Gathers a network of research documents, a version control system, and collaboration software.
- ***SlideShare***– Community for sharing presentations and other professional content
- ***gov.uk***-The British government's official data portal offers access to tens of thousands of data sets on topics such as crime, education, transportation, and health
- ***gov***- The USA government's official data portal offers access to tens of thousands of data sets
- ***gov.in***- Open Government Data (OGD) Platform India – is a platform for supporting Open Data initiative of Government of India. The portal is designed to be used by Government of India Ministries/ Departments their organizations to publish datasets, documents, services, tools and applications collected by them for public use. It aimed to increment transparency in the functioning of Government and also open avenues for many more discover uses of Government Data to give different angle.
- ***Code Ocean***– Cloud-based computational platform which provides a way to share, discover and run published code.

- *Peer Evaluation*– Open repository for data, papers, media coupled with an open review and discussion platform.
- Org offers open government data from US, EU, Canada, CKAN, and more.
- Google Finance 40 years' worth of stock market data, updated in real-time.
- You can also use <https://toolbox.google.com/datasetsearch> to search the required data set.

3. *Connect & Communicate with experts and researchers*

- Academia– A place to share and follow research and researchers.
- *net*– Online platform for professional networking and sharing of knowledge in life sciences.
- Open Science Framework– Gathers a network of research documents, a version control system, and collaboration software.
- Research Gate– Social network for researchers.
- Academic Joy– Sharing research ideas and story in research and innovation.
- Experiment– Crowd funding Platform for Scientific Research.
- LinkedIn- Connect with people in your area of interest.
- Thinkable– Platform to mobilize knowledge and fund breakthrough ideas.
- Science Open– Freely accessible research network to share and evaluate scientific information.
- *Communication tools*– web-ex, Skype, Team Viewers, anywhere,

4. *Free Digital Library*

- The National Digital library of India is a project under the Ministry of Human Resource Development, India. The purpose is to integrate several national and international digital libraries in one single web-portal. The NDL bargain free access to many books in English and the Indian languages.
- Internet Archive is a non-profit library of millions of free books, movies, software, music, websites, and more. The Internet documents offers over 12,000,000 freely downloadable books and texts. There is also a collection of 550,000 modern eBooks that may be borrowed by anyone.
- The Ministry of Human Resource Development (MHRD), Government of India has launched a National Repository of Open Educational Resources (NROER).
- The ultimate goal of the Open Library is to make all the published works of humankind available to everyone in the world. While wide in scope and ambition, this goal is within our grasp. Achieving it will necessary the participation of librarians, authors, government officials and technologists.

- ManyBooks provides **free eBooks for your PDA, iPod or eBook Reader**. You can randomly browse for an eBook by the most popular titles, recommendations or recent reviews for visitors. There are 21,282 eBooks obtainable here and they're all free!
- GetFreeEBooks is a free eBooks site where you can download free books free. All the eBooks into the site are legal downloadable free eBooks.

5. Simulation/Lab and project management

Internet of things is coming to laboratories and connecting instrumentation to the internet allowing us to perform experiments from anywhere in the world.

- Virtual Labs project is an initiative of the Ministry of Human Resource Development (MHRD), Government of India under the aegis of National Mission on Education through Information and Communication Technology (NMEICT). This project is a fellowship activity of twelve participating institutes and IIT Delhi is coordinating institute. It is a illustration shift in ICT-based education. For the first time, such an initiative has been taken-up in remote-experimentation.
- Lab Suit– Inventory Management, orders Management, materials Trade-In, price Comparison.
- Life technologies Lab Management Tool – Management tool for lab equipment and services.
- LiveLabSpace– Collaborative research tool that lets you plan experiments, replicate outcomes and generate research papers.

➤ 6 Write & publish research papers

Tools are required to store and manage references, collaborations across labs and continents, **collaborative writing tools** & track of the modifications done by others to the copy.

- CitationStyles – Find and edit CSL citation styles.
- Papers – helps you collect and curate the research material that you're passionate about.
- Zotero – helps you collect, organize, cite, and share your research sources
- Draft – Version control and collaboration to improve your writing.
- Typewrite – A simple, real-time collaborative writing environment.
- ScienceOpen – Freely accessible research network to share and evaluate scientific information.

8.4.1 E portfolios:

An electronic portfolio (also known as a digital portfolio, online portfolio, e-portfolio, e-folio, or e- folio) is a gathering of electronic evidence assembled and managed by a user, usually on the Web. Like this electronic evidence may include input text, electronic files, images, multimedia, blog entries, and hyperlinks. E-portfolios are both demonstrations of the user's abilities and entresol for self-expression. If they are online, users can hold down them dynamically over time.

One can regard an e-portfolio as a form of learning record that provides real evidence of gain. Learning records are closely related to the learning plan, an emerging tool which individuals, teams, communities of interest, and organizations use to manage learning To the extent that a personal learning environment captures and displays a learning record, it may also manage as an electronic portfolio.

E-portfolios, like traditional portfolios, can reflex students' reflection on their own learning, leading to more awareness of learning method and needs. Comparative research by M. van Wesel and A. 'Prop between paper-based portfolios and electronic portfolios in the same setting tentatively suggest that use of an electronic portfolio may lead to better learning outcomes.'

A developmental e-portfolio can display the advancement of skill over a period of time commandment. The main purpose is to provide a course for communication between student and instructor. An evaluate portfolio will demonstrate skill and competence in a specific domain or area. A showcase portfolio highlights astral work in a specific area; it is typically shown to potential employers to achieve employment. When it is used for job application it is sometimes called '*career portfolio*'. Most e-portfolios are a mix of the three main types to make hybrid portfolio.

➤ *Types of e-portfolios*

There are three main types of e-portfolios-

- developmental (e.g., working)
- assessment
- showcase

➤ *Using e-portfolio:*

Using e-portfolio

Once you decide to implement the use of e-portfolio for students, you need to plan and organize portfolio's work.

- a) In (Prendes Espinosa & Sánchez Vera, 2008) recommends six steps to implement them in education: Giving info from the very beginning. It is important to communicate clearly too all students involved in the process, the purpose of the portfolio and specific criteria for production and evaluation.
- b) Limiting the number of components.
- c) Defining the evaluation criteria of portfolio.
- d) Teaching and facilitating the processes of self-reflection and self-evaluation. This is an important step, because students usually do not know how to deal with them.
- e) Indicating the appropriate time for the portfolio.
- f) Providing advice and preparing students for the realization of portfolio.

➤ *Educational Implication:*

The uses of e-portfolios are most ordinary in the courses with departments of education. Most preserves teachers are asked to compile an e-portfolio to demonstrate competencies needed to achieve teaching certification or licensure. Student e-portfolios are increasingly being used in other disciplines for example communications, math, business, nursing, engineering and architecture. In education e-portfolios have six major functions:

- Document skills and learning;
- Record and track development within a program;
- Plan educational programs;
- Evaluate and monitor performance;
- Evaluate a course;
- Find a job

8.4.2.1 Online Repositories: Digital repositories are information systems that ingest, store, manage, preserve, and provide access to digital content. The OAIS model bargain a conceptual based for designing standard-compliant repositories. Digital repositories are a relatively new event that emerged in the early 2000s. A concept of trusted digital repositories has been moving to ensure high-level preservation services for all types of repositories. There are various repositories types, including institutional, disciplinary, government, and centralized repositories, which aggregate content from several subsidiary repositories. According to the Directory of Open Access Repositories, most of the content in open access (83.2%) is available through institutional repositories (OpenDOAR, 2015). As Lynch (2003) observes, institutional repositories offer an essential infrastructure for scholarship in the digital age and a potential to revolutionize scholarly communication. He also notes that a key part of the service is to manage technological change and the migration of digital content from one set of technologies to the next.

- Digital repositories can be thought of as digital collections for which:
- Content is deposited, whether by the content creator, owner or third party;
 - The repository architecture manages content as well as metadata;
 - The repository offers a minimum set of basic services e.g., put, get, search, access control; and
 - The repository must be sustainable and trusted, well-supported and well-managed (Heery & Anderson 2005, p.6).

➤ *Characteristics of sustainable digital repositories:*

- Accept responsibility for the long-term maintenance of digital resources on behalf of its depositors and for the benefit of current and future users
- Have an organizational system that supports not only long-term viability of the repository but also the digital information for which it has responsibility
- Demonstrate fiscal responsibility and sustainability
- Design its system(s) in accordance with commonly accepted conventions and standards to ensure the ongoing management, access, and security of materials deposited within it
- Establish methodologies for system evaluation that meet community expectations of trustworthiness
- Be depended upon to carry out its long-term responsibilities to depositors and users openly and explicitly
- Have policies, practices, and performance that can be audited and measured (Beagrie et al., 2002, p. 5)

8.4.2.2 Online Libraries:

A digital library is a library in which collections are stored in digital formats (as opposed to print, microform, or other media) and available by computers. The satisfied may be stored locally, or accessed remotely. The first published use of the term may have been in a 1988 report to the Corporation for National Research Initiatives. The term was first popularized by the NSF/DARPA/NASA Digital Libraries persuasive in 1994. Bush (1945) created a vision based on experience (“Digital library.”)

Initiative in 1994. Bush (1945) created a vision based on experience (“Digital library.”)

- Organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are smoothly available for use by a defined community or set of communities. (Shiri 2003)

➤ *Function of Digital Library*

Access to large amounts of information to users-

- Access to primary information sources.
- Support multimedia content along with text
- Network accessibility on Intranet and Internet
- User-friendly interface
- Hypertext links for navigation
- Client-server architecture
- Advanced search and retrieval.
- Integration with other digital libraries.

➤ *Purpose of Digital Library*

- Expedite the systematic development of procedures to collect, store, and organize, information in digital form.
- Promote efficient delivery of information economically to all users.
- Encourage co-operative efforts in research resource, computing, and communication networks.
- Strengthen communication and collaboration between and among educational institutions.
- Take leadership role in the generation and dissemination of knowledge

➤ *Components :*

The components of a digital library are:

- Infrastructure
- Digital Collection
- Systems function
- Telecommunication facility
- Human resources

➤ *Planning for Digital Library*

A digital library committee should be made to plan for its creation and maintenance. The members must be from different library departments, and, if necessary, consultants can be rented. There are at least two path of developing a digital library: converting a traditional library into a digital library, and direct development of a digital library. Planning includes:

- i. *IT Infrastructure*
- ii. *Digitization*
- iii. *Access*
- iv. *Staffing*
- v. *Furniture, equipment, and space*
- vi. *Services*
- vii. *Funding*

➤ *Creation of Digital Resources :*

- Database of digital material that is open to all users over the campus-wide LAN.
- High bandwidth Internet connectivity
- Focus selectively on acquiring digital resources
- Electronic journals, and gradual elimination of print subscriptions
- Licensed databases
- Creation of local digital content available within the university

➤ *Advantages of a Digital Library*

“Digital Libraries: Functionality, Usability, and Accessibility,” Dr Mayank Trivedi. Library Philosophy and Practice 2010 (May)

- a) Nearly unlimited storage space at a much lower cost
- b) Re-allocate funds from some staff, collection maintenance, and additional books
- c) No physical boundary
- d) Round the clock availability
- e) Multiple access
- f) Enhanced information retrieval.
- g) Preservation for some print material
- h) Added value
- i) Universal accessibility

➤ *Limitations :*

- Lack of screening or validation
- Lack of preservation of a fixed copy (for the record and for duplicating scientific research)
- Lack of preservation of “best in class”
- Difficulty in knowing and locating everything that is available, and differentiating valuable from useless information.
- Job loss for traditional publishers and librarians
- Costs are spread and many become hidden

8.4.3 Online and Offline assessment tools

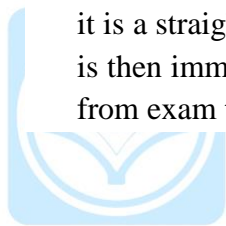
8.4.3.1 Offline assessment tools: Offline exam delivery, or offline assessment, is the method by which organizations can run computer-based examinations in remote areas where there is not a reliable internet connection available, instead of relying on a paper-based process which is stiff and hard to administer. True offline exams do not even require an internet connection on exam day, to launch or submit the exam.

➤ *Disadvantages of online assessments*

Not much can be said touching the disadvantages of online assessments, since the advantages outweigh them through far. But there might be some, for example, you need to be computer literate (or able to use a computer well) in order to create and take an assessment. Technology is not always feasible; there strength is connection or internet problems, energy breaks and other things like that. Further, there’s a cost involved in online assessment software.

- **Fairness:** It gives all candidates the same exam experience irrespective of whether a candidate is at a location with good broadband and is able to take their exam online, or is at an area with poor internet connectivity so they take their exam offline. Without the might to deliver computer-based exams offline, then typically those without internet connection have to use pen & paper – this is neither fair nor reasonable.
- **Candidate benefits:** Even though there is no internet connection, people can sit their exams on a computer using the same tools they use in their work environment, so being able to type more than write with pen, the option to cut/paste text, use spreadsheets.

- All data in one system: For the examining body, using different exam delivery methods but keeping it all computer-based, means that all data is retained in the same system and is completely secure. So no matter where the candidate is based, their details, exam paper and results are all stored securely in one application, and all results for all candidates are available on the same dashboard.
- Increased security: Some organizations run paper-based examinations in areas without internet connectivity, which are then scanned and marked in the same system as computer-based tests that were run in other locations. With this obtainment, there is constantly a risk of paper exams being lost or question content compromised. Moving to offline computer-based delivery removes this security risk.
- Randomised papers: If you wish to generate random exam papers for candidates, where questions are selected from question banks according to different rules such as topic, difficulty rating etc., this can easily be achieved using offline delivery. This helps maintain security and reduces the risk of collusion between candidates at test centres (as everyone taking the exam has a unique exam paper).
- Speed of marking and results: Transporting and scanning paper-based answer sheets typically takes quite a bit of time. With an offline solution, at onetime the exam is crowned, it is a straightforward process to safely upload an electronic package of exam data, which is then immediately available to markers or for results processing, so the turnaround time from exam to results being issued to candidates is greatly reduced.



8.4.3.1 Online assessment tools:

Electronic assessment, also known as '*digital assessment*', e-assessment, online assessment or computer-based assessment(CBA), is the use of information technology in assessment as educational assessment, health assessment, psychiatric assessment, and psychological assessment. This shroud a broad range of activity ranging from the use of a word processor for assignments to *on-screen testing*. Specific types of e-assessment comprise multiple choice, online/electronic submission, computerized adaptive testing and computerized classification testing.

It has also been prominent that in regards to university level work, providing electronic feedback can be more time-consuming than traditional assessments, and so more expensive.

In 1986, Lichtenwald searcher the test validity and test reliability of either personal computer administration or a paper and pencil administration of the Peabody Picture Vocabulary Test-Revised (PPVT-R). His project report included a review and analysis of the literature of pre mid 1980s E-assessment systems.

A reconnoiter of the literature of E-assessment from the 1970s until 2000 examined the advantages and disadvantages of E-assessments.

A elaborate review of the literature regarding advantages and disadvantages of E-assessment for various types of tests for different types of students in different educational environment from childhood by young adulthood was completed in 2010. In higher education system, there is variation in the path academics take the benefits of e-assessment. While whatever perceive e-assessment processes as integral to teaching, others think of e-assessment in isolation to teaching and their students' learning.

➤ *Advantages of online assessments*

- The use of online assessments saves companies a lot of time and money.
- Often the assessments can be completed in less time, multiple candidates can complete the online assessment at the same time and there is no need for learned personnel.
- The test takers are capable to take the assessment during class, or at home, using their own devices. You get to see their outcome and answers and get instant feedback about your selected topic.
- That helps you, as a researcher, recruiter, teacher or trainer, to learn more about your users and accommodate to their needs, strengths and weaknesses.



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Previous Year Question

J	0	9	1	4
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Paper-III

1. Which is not true of interactive video?
 - A) Presentation of video pictures
 - B) Presentation of CAI materials
 - C) Use of principles of programmed instruction
 - D) Learning becomes meaningful rather than instructional
2. What is the verbal component of poster?
 - A) Visual
 - B) Caption
 - C) Pictorial
 - D) All of the above
3. External programmed instruction is also known as
 - A) Linear programmed instruction
 - B) Internal programmed instruction
 - C) Interpretive programmed instruction
 - D) Crowderian programmed instruction
4. Which of the following is not a component of basic teaching model?
 - A) Instructional objectives
 - B) Instructional Procedures
 - C) Instructional assessment
 - D) Performance assessment

5. Match Column-A with Column-B:

Column-A

- (a) Audio-visual aids
- (b) Behaviour technology
- (c) Programmed instruction
- (d) Training psychology

Column-B

- i) Software
- (ii) Hardware
- (iii) Management techniligy
- (iv) System analysis
- (v) Internet

Codes:

- A) (a) and (i)
- (B) (a) and (ii)
- C) (c) and (iv)
- D) (d) and (i)

6. Which of the following element contributes to educational achievement of distance learners?

- A) Student assignment of distance learners?
- B) Course material
- C) Personal contact programme
- D) All of the above

7. Which of the following statement is incorrect about micro-teaching?

- A) It is a method of teaching.
- B) It consists of core teaching skills.
- C) Each skill is practiced separately.
- D) Questioning is one component of micro-teaching.

Answer & Reference Table

SL.NO.	QUESTION NO.	ANSWER	REFERENCE NO.
1.	51.	D	8.1.1
2.	52.	B	8.1.1
3.	53.	C	8.1.4
4.	54.	C	8.1.8
5.	55.	B	8.2.6
6.	56.	D	8.2.7
7.	57.	A	8.1.4



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D	0	9	1	4
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Paper-III

1. While using the Flander's Interaction Analysis the focus is on
 - (A) Class climate
 - (B) Learner Behaviour
 - (C) Teacher Behaviour
 - (D) Class interaction
2. The programmed instruction uses the learning paradigm of
 - (A) Classical conditioning
 - (B) Operant conditioning
 - (C) Instrumental conditioning
 - (D) Instructional conditioning
3. What is the correct sequence in the evolution of distance education movement in India?
 - A) Correspondence courses, distance learning, open learning, open universities
 - B) Correspondence courses, open learning E-learning, distance courses
 - C) Home delivery, correspondence courses, open learning, virtual learning
 - D) Home delivery, open learning, correspondence courses, virtual learning
4. A teacher reflects on the attitude of his/her students towards the subject taught by him or her in the class. This is an activity suitable at
 - (A) Pre-active stage of learning
 - (B) Interactive stage of learning
 - (C) Post active stage of learning
 - (D) Intuitive stage of learning

Answer & Reference Table

SL.NO.	QUESTION NO.	ANSWER	REFERENCE NO.
1.	61.	C	8.1.8
2.	62.	B	8.1.4
3.	63.	C	8.2.7
4.	64.	C	8.1.5



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D	0	9	1	5
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Paper-III

1. Set - I contains some models of teaching. From Set - II, identify to which family of teaching models they belong and choose correct code:

Set - I

Set - II

(Model of teaching)

(Family of teaching models)

- | | |
|-----------------------------------|---|
| (a) Jurisprudential Inquiry model | (i) Information processing family |
| (b) Synaptic model of teaching | (ii) Personal family |
| (c) Inductive training model | (iii) Behavioural models of teaching |
| (d) Stress reduction model | (iv) Social Interaction oriented family |
| | (v) Models for thinking about models |
| | (vi) Historical teaching models |
| | (vii) Philosophical models of teaching |



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Codes:

- | | | | |
|-----------|------|-------|-------|
| (a) | (b) | (c) | (d) |
| (1) (vii) | (v) | (ii) | (iv) |
| (2) (iv) | (ii) | (i) | (iii) |
| (3) (ii) | (iv) | (vii) | (i) |
| (4) (iii) | (vi) | (ii) | (vii) |

2. Which of the following principles is not associated with the programmed instruction?

- A) Principle of self pacing
- B) Principle of active responding
- C) Principle of immediate conformation
- D) Principle of simulated responding

3. From the following, select which is the appropriate series of steps to be followed in system analysis?

- A) Review of systems operation, formulation of objectives, collection and analysis of data, specifying operations in the problem area, block diagram, isolation of the problem
- B) Formulation of objectives, review of systems operation, collection and analysis of data, isolation of the problem, specifying operations in the problem area, block diagram
- C) Review of systems operation, formulation of objectives, specifying operations in the problem area, collection and analysis of data, isolation of the problem, block diagram
- D) Formulation of objectives, review of systems operation, isolation of the problem, collection and analysis of data, specifying operations in the problem area, block diagram

4. The main blocks to communication in open and distance learning are derived from the:

- (1) Human teacher
- (2) fact of distance
- (3) Quality of the instructional material
- (4) nature of content to be presented

5. Mode of communication in use of criterion referenced tests is directly connected with :

- (1) Effectiveness of feedback
- (2) logistics of communication
- (3) Quality of teaching
- (4) quality of learning

Answer & Reference Table

SL.NO.	QUESTION NO.	ANSWER	REFERENCE NO.
1.	61.	B	8.1.2
2.	62.	D	8.1.4
3.	63.	B	8.1.2
4.	64.	C	8.2.7
5.	65.	A	8.1.2



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J	0	9	1	6
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Paper-III

1. Which of the following sets of statements relate more appropriately to the meaning and scope of Educational technology? For your answer, select the correct alternative set from the code given under the list of statements.

- I) Hardware in ET is the modality of presentation whereas software is the content or message which is presented.
- II) ET caters to memory level teaching only.
- III) Interactive stage of teaching is outside the scope of ET.
- IV) ET aims at optimizing learning outcomes.
- V) ET is restricted to only conditioning and training modalities.
- VI) System's approach in ET followed hardware and software approaches.
- VII) The purpose of multimedia is confined to making engagement in learning sustained
- VIII) Simple cognitive interchanges in teacher and learner form part of reflective level teaching.

Codes :

- 1) (i), (ii), (iii) and (iv)
- 2) (vi), (vii), (viii) and (ii)
- 3) (i), (iv), (vi) and (viii)
- 4) (ii), (iii), (iv)

2. In the following list of statements, those which are true and acceptable form a set. Identify the correct set from the code to indicate your answer.

- (i) Microteaching is basically a training strategy aimed at teaching of instructional skills.
- (ii) In branching programmes feedback to the learner is immediate while in linear programmes it is slightly delayed.
- (iii) Flander's interaction analysis is aimed at observing direct and indirect influence patterns of teaching behaviour.
- (iv) There is no difference between correspondence, distance and open concepts of distance education.
- (v) Criterion referenced tests are related to individualized instruction.
- (vi) Basic teaching model of Robert Glaser can form the basis of analysing the components of other teaching models.

Codes:

- 1) (i), (ii), (iii) and (iv)
- 2) (ii), (iv), (v) and (vi)
- 3) (iii), (iv), (i) and (ii)
- 4) (i), (iii), (v) and (vi)

3. The structure of a frame in linear, branching and computer assisted instruction consists of three important components. What is the usual sequence underlying this structure. Select from the alternatives given below.

- 1) Feedback given, Response made, Prompted answer.
- 2) Information given, Response made, Feedback delivered.
- 3) Partial information given, No response asked for, Feedback delayed.
- 4) Part of the information withheld, Response asked for, No feedback given.

4. In designing instructional systems, what is the correct sequence insisted? Choose from the alternatives given below?

- A) Deciding of instructional strategy, task analysis, formulation of objectives and evaluation rubrics.
- B) Formulation of objectives, deciding evaluation rubrics, task analysis, choice/use of instructional strategies.
- C) Formulation of instructional objectives, task analysis, designing of instructional strategies and evaluation rubrics.
- D) Deciding evaluation rubrics, formulation of instructional objectives, task analysis design instructional strategies.

5. What are the various strategies used for modifying teaching behavior in ET? Select from the following list of alternatives to indicate your answer.

- A) Micro-teaching, instructional analysis, action research use of hardware understanding level teaching and simulation.
- B) (2) Sensitivity training, micro teaching, action research, simulation, interaction analysis proceeding and programs instruction strategies.
- C) (3) Programmed instructional strategy, discussion, projects, brainstorming, action research and lecturing.
- D) (4) Lecturing, discussions, use of computers, brainstorming, projects and teaching machines.

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Answer & Reference Table

SL.NO.	QUESTION NO.	ANSWER	REFERENCE NO.
1.	61.	C	8.1.1
2.	62.	D	8.1.8
3.	63.	B	8.1.3
4.	64.	C	8.1.4
5.	65.	B	8.1.6



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J	0	9	1	7
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Paper-III

1. Set-I contains some models of teaching. From Set-II identify the corresponding family of teaching models and choose the correct code :

Set-I

Set-II

(Models of Teaching)

(Family of Models)

(a) Inquiry training model

(i) Social interaction

(b) Concept attainment model

(ii) Role playing

(c) Desensitization model

(iii) Personal development

(d) Cooperative model

(iv) Information processing

(v) Behavioural

Codes:

- | | | | | |
|-----|-------|-------|-------|------|
| | (a) | (b) | (c) | (d) |
| (1) | (ii) | (i) | (iii) | (iv) |
| (2) | (iii) | (iv) | (v) | (i) |
| (3) | (iv) | (ii) | (i) | (v) |
| (4) | (i) | (iii) | (v) | (ii) |

2. The use of system approach is preferred on the following grounds:

- a) It lays emphasis on instructional objectives.
- b) It controls the efforts of teacher in designing class room communication.
- c) It encourages the involvement of community in planning teaching learning situations.
- d) It helps in setting the criteria for the assessment of teaching.
- e) It involves the use of task analysis.

A. Codes:

- A) (a) (b) (d) (e)
- B) (d) (b) (e) (c)
- C) (e) (d) (c) (b)
- D) (b) (e) (c) (a)

3. Match the strategies in Set-I with those of their corresponding characteristics in Set-II and select the correct code:

Set-I

Set-II

- | | |
|------------------------|--|
| (a) Team teaching | (i) Training in the component skills of teaching in stages |
| (b) Creative teaching | (ii) Role playing |
| (c) Simulated teaching | (iii) Encouraging spontaneity |
| (d) Micro teaching | (iv) Expert interaction |
| | (v) Direct interaction |

Codes:

- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|------|-------|
| (1) | (ii) | (iii) | (v) | (i) |
| (2) | (iv) | (i) | (v) | (iii) |
| (3) | (iii) | (iv) | (i) | (v) |
| (4) | (iv) | (iii) | (ii) | (i) |

4. In the following list of statements identify the correct set:

- a) Linear programming is developed by using immediate reinforcement.
- b) Interactive phase of teaching facilitates the process of communication.
- c) Synectic method facilitates creative process.
- d) Flanders interaction analysis focuses on indirect talk patterns.
- e) Instructional strategies are centred on information based on divergent thinking.

Codes:

- A) (a) (e) (d) (c)
- B) (a) (b) (c) (d)
- C) (b) (a) (e) (c)
- D) (c) (e) (b) (d)



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Answer & Reference Table

SL.NO.	QUESTION NO.	ANSWER	REFERENCE NO.
1.	58.	B	8.1.4
2.	59.	A	8.2.1
3.	60.	D	8.1.6
4.	61.	B	8.1.4



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Paper-II

1. Which of the following combinations explains the concept of distance education?

- (i) Providing educational facilities from a distance
 - (ii) Using ICT and other modern techniques of learning
 - (iii) Providing quality education at affordable cost
 - (iv) Providing educational opportunities to geographically unreachable
 - (v) Increasing literacy rate of the country in a short span of time
- Choose the correct answer from the code given below :

Code:

- (1) (ii), (iii), (iv) and (v)
- (2) (i), (ii) and (iv)
- (3) (i), (iv) and (v)
- (4) (i), (ii), (iii) and (iv)

2. From the list given below, identify effective curriculum transactional strategies.

- (i) Development of E.T. resources
 - (ii) Capacity building of teachers in respect of use of suitable pedagogy
 - (iii) Multiple methods to be used as a general practice
 - (iv) Inviting parents to school during national celebrations
 - (v) Strengthening professional groups of teacher educators
 - (vi) Objective based formative and summative evaluation
- Choose the correct answer from the code given below :

Code:

- (1) (i), (iv) and (v)
- (2) (i), (iii) and (vi)
- (3) (ii), (iv) and (v)
- (4) (ii), (iii) and (vi)

3. Which of the following statements pertain to understanding level teaching ?

- (i) The teacher presents information with a view to get it reproduced from students.
- (ii) There is enough interaction ensured with the help of suitable examples.
- (iii) The sequence of ideas presented by the teacher is insisted.
- (iv) Teaching becomes dialogic and makes the learner active.
- (v) There is enough scope provided for clarification, addition and reorganizing of ideas by the teacher.
- (vi) Teacher provides codes of various thoughts so that students do not miss them. Choose the correct answer from the code given below :

Code:

- (1) (i), (iii) and (vi)
- (2) (iv), (v) and (vi)
- (3) (i), (ii) and (iii)
- (4) (ii), (iv) and (v)

4. In the following statements are reflected the meaning and scope of educational technology in the present context. Identify those which are systems' approach.

- (i) Teaching aids render the classroom presentations interesting and engaging.
- (ii) Instruction has to be planned, implemented and evaluated in terms of learner needs.
- (iii) The classroom is a learning space for information processing.
- (iv) That which is put into the classroom instruction ensures the quality of learning and learning outcome.
- (v) Optimize intended knowledge and skills.
- (vi) Learning resources have to be effectively harnessed in order to accomplish instructional objectives.

Choose the correct answer from the code given below:

Code:

- (1) (iii), (iv) and (vi)
- (2) (ii), (iv), (v) and (vi)
- (3) (i), (ii) and (v)
- (4) (i), (ii) and (iii)

5. Given below are two statements, one labeled as Assertion (A) and the other labeled as Reason (R). Read the statements and choose the correct answer using the code given below.

Assertion (A): Teaching behaviour belongs to the category of being a modifiable set.

Reason (R): Microteaching, simulation and interaction analysis procedures contribute to modification of teaching behaviour.

Code:

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (3) (A) is true, but (R) is false.
- (4) (A) is false, but (R) is true.

6. Which of the following types of communication models provides the best understanding in respect of human communication ?

- | | |
|-----------------------------|---------------------------|
| (1) The Linear Model | (2) The Interaction Model |
| (3) The Transactional Model | (4) The Horizontal Model |

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7. In the two lists given below – List I mentions the styles of programmed instructions while List II embodies the list of key features. Match the two lists and choose the correct answer from the code given below.

List-I

(a) Linear
acts

(b) Branching

(c) Mathetics
home page

(d) Computer Assisted Learning and Teaching
immediate reinforcement and (CALT)

List-II

(i) Software based regulation of teaching and learning

(ii) Demonstrate, prompt and release sequence of frames

(iii) Relatively larger frame size with error treatment and

(V) Active responding,

small step presentation

Codes:

(a) (b) (c) (d)

(1) (i) (ii) (iii) (iv)

(2) (v) (iii) (ii) (i)

(3) (iii) (iv) (i) (ii)

(4) (iv) (v) (iii) (ii)



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Answer & Reference Table

SL.NO.	QUESTION NO.	ANSWER	REFERENCE NO.
1.	57	B	8.2.7
2.	68	C	8.1.4
3.	83	D	8.1.4
4.	85	B	8.2.1
5.	86	D	8.1.8
6.	87	B	8.1.2
7.	88	C	8.1.4



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