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INFORMATION AND COMMUNICATION TECHNOLOGY IN EDUCATION

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1.0 Objectives

After reading this unit you will be able to:

- State the meaning of Information, Communication and Technology respectively.
- Define the term –Educational Technology.
- Explain the concept of Educational Technology.
- Examine the applications of Educational Technology
- Analyze the characteristics of Educational Technology
- Define the term ICT- (Information and Communication and Technology)
- State the meaning and concept of ICT.
- Identify the role of ICT in higher and Teacher's Education.
- Examine the applications of the ICT in Research.

1.1 Introduction

The rapid development and spread of digital technology in the 1990's contributed to advancing industrialization and also improving the economic status of the countries. IT (Information Technology) is influencing every aspect of human life. It is playing a role in each and every aspect, such as at work places, education, entertainment, business, economic trends etc.

In this digital world it is important to use technology in the classroom, so the students get the opportunity to learn and apply the digital Skills.

ICT is making dynamic changes in society. We could see these changes more in education as teachers and students are getting more opportunities to adopt the teaching and learning needs of an individual with ease.

ICT provides tools for educational change and reform. But the effective use of ICT & its integration is really a challenge.

In this unit we will get an overall idea about the concepts of ICTs. We will also discuss the role of ICT and applications.

1.2 An Overview

When we think about the term digital / digitalization, what comes to mind? The answers may differ from person to person, some would say information explosions, communication, electronic media, technology, and so on. This leads us to know more about all aspects of ICT. The aspects are Information, Technology and Communication, when all these three are integrated effectively we could get a clear Idea about what exactly the ICT is?

ICT spans a wide variety of areas such as processes, software, hardware, programming languages, system designs, data management, data mining, data retrieval, multimedia, and computing.

ICT is the use of computers and software to manage information.ICT is responsible for storing information, protecting information, processing the information, transmitting the information and later retrieving the information as and when necessary.

In this section we will discuss Information Technology, Communication Technology and Educational Technology basics.

1.3 Information Technology

Information is data that has been processed to make it meaningful.

Meaningful data $\Box \Box$ Information

Interpreted data $\Box \Box$ Information

Processed data $\Box \Box$ Information

In simple terms information is the processed data that has been converted into meaningful and useful form for specific use. The technology, which is exclusively designed to store, process, and transmit information, is known as Information Technology.

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UNESCO defines Information Technology as "scientific, technological and engineering disciplines and the management techniques used in information handling and processing information, their applications; computers and their interaction with man and machine and associated social, economic and cultural matters". (Stokes)

1.3.1 Role of IT in Education

- 1. Access to a variety of learning resources In the era of technology, IT aids have plenty of resources to enhance teaching skills and learning ability. With the help of IT now it is easy to provide audio visual education. Learners are encouraged to regard computers as tools to be used in all aspects of their studies. In particular, they need to make use of the new multimedia technologies to communicate ideas, describe projects, and order information in their work.
- 2. Immediacy to information IT has provided immediacy to education. Now in the year of computers and web networks the pace of imparting knowledge is very fast and one can be educated anywhere at any time.
- **3.** Any time learning Now in the year of computers and web networks the pace of imparting knowledge is very fast and one can be educated. One can study whenever he wants irrespective of geographical conditions.
- 4. Collaborative learning Now IT has made it easy to study as well as teach in groups or in clusters. The Internet and its Web sites provide this facility.
- 5. Multimedia approach to education Audio-Visual education, planning, preparation, and use of devices and materials for educational purposes. Among the devices used are still and motion pictures, filmstrips, television, transparencies, audiotapes, records, teaching machines, computers, and video discs. The growth of audio-visual education has reflected developments in both technology and learning theory. IT provides authentic and updated information

1.4 Communication Technology

Communication means to inform, to tell or to give information. Communication is also interpreted as an interchange of thoughts. Some of the definitions of communication are as follows.

George R. Terry - Communication is an exchange of facts, opinions or emotions by two or more persons.

Communications technology is older than computer technology. It has grown as rapidly as computer technology in recent times. A

communication system can establish paths over which messages can be sent between any two instruments in specified locations at desired times.

Communication technology refers to all the tools used to send, receive, and process information.

The purpose of communications technology plays a vital role in the field of education, as education means to impart knowledge. To fulfill the whole & sole of the education process communication is important. Communication encompasses the bridge between teacher educator and student.

In this section we discussed what Information and Communication Technology means, also how they are interrelated with each other.

In further sections let us discuss educational technology in detail.

1.5 Educational Technology

Technology is becoming a boon for teachers as it is helping them to teach more effectively. Education has been benefited by technology in different ways, and at various levels. Technology has made an impact on education training.

If we talk about the current situation, many institutes worldwide are offering courses through various technologies such as Internet, multimedia, live TV, computer (Audio/video conferencing) etc. The result is a large number of learners are pursuing their studies through technology (online/ offline).

It became very much essential for all who are members in the field of education to get familiar with the use of technology in education.

In the early period when writing was unknown, verbal communication was the part of learning. The more emphasis on students practice was memorization, the oral teaching method was maintained traditionally in the Gurukul system. Later writing developed & different means of communication materials were used like writing on leaves, tree - trunks, engraving on metals, engraving on rocks and gradually paper and ink got introduced which helped in development of printing materials, textbooks. This is an advent in Technology.

This developed technology later on helped in utilization and production of different materials like chalk-board, pictures, charts, diagrams, graphs and graphics. This concept get broadened with new innovations in CAI (Computer Assisted Instructions).

1.5.1 Meaning And Scope Of Educational Technology (ET)

The interface of education and technology is known as Educational Technology.



(Educational Technology)

Educational Technology is associated with two different aspects.

- Technical equipment such as electronic media (OHP, Computer, Television, Radio etc.)
- Scientific and systematic analysis of the teaching learning process to improve its effectiveness.

Let us see some notable definitions of Educational Technology by different individuals.

- 1. Shiv K. Mitra "Educational Technology can be conceived as a science of techniques and methods by which educational goals could be realized".
- 2. S.S. Kulkarni-"Educational Technology may be defined as the application of laws as well as recent discoveries of science and technology to the process of education".
- **3. J.R. Gases-** "Educational Technology has to be seen as part of a persistent and complex endeavor of bringing pupils, teachers and technical means together in an effective way".
- 4. According to AECT (Association of Educational Communications and Technology)- "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources." (AECT, 2007)
- 5. G.O.M. Leith-"Educational Technology is the systematic application of scientific knowledge about teaching learning and conditions of learning to improve the efficiency of teaching and training."
- 6. Robert M. Gagne "Educational Technology can be understood as a means for the development of a set of systematic techniques and accompanying practical knowledge for designing, testing and operating schools as educational systems".

From these above definitions we could see the wide differences in opinions. These definitions reflect the whole range of activities included in educational technology.

Scope Of Educational Technology

- The term education includes teaching, learning, instructions and training similarly the scope of educational technology is also much
- wider. Let us Focus on the areas and scope of Educational Technology.



(Figure: 1.5.1.1)

1.5.2 Characteristics Of Education Technology

- 1. The basis of Educational Technology is science.
- 2. It is more practical discipline rather a less theoretical one.
- 3. It is a modern discipline.
- 4. It brings teachers, pupils & technology together in an effective way.
- 5. It is the science of techniques and methods.
- 6. It is concerned with improvement in the teaching learning process.
- 7. ET is a continuous and dynamic process.
- 8. New innovations are possible due to technological intervention.
- 9. Educational Technology is the practical aspect of science.
- 10. Synchronized with learning theories and the art of teaching.
- 11. Educational Technology creates a fruitful environment to achieve learning objectives.
- 12. Educational Technology is wider.
- 13. ET is a fast growing modern technology.
- 14. ET involves input, output and process aspects of education.
- 15. ET is the science of imparting technique and methods.
- 16. Safe environment learners are free to utilize.
- 17. ET is more informative, creative, collaborative, versatile, engaging, trustworthy, available and reliable.
- 18. It involves desired changes in traditional methods.

1.5.3 Objectives Of Educational Technology

Educational Technology provides an aid in the teaching-learning process for achieving results through the available resources.

The following are the objectives of Educational Technology.

- 1. To identify educational needs and aspirations of the learners.
- 2. To identify the aims of education with its structure.
- 3. To develop man-made resources and the process to utilize them.

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- 4. To develop technology-based teaching models to improve the efficacy of education.
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- 5. To help in extending educational opportunities to the masses.
- 6. To overcome the barriers in education through distance learning.
- 7. To administer managing strategies in the educational system such as planning, implementation, evaluation and feedback phases.
- 8. To analyze the teaching learning process.
- 9. Development of curriculum and courses.
- 10. Development of teaching learning materials.
- 11. To impart training to teachers.
- 12. To develop teaching strategies.
- 13. To develop the ideas of selecting the use of appropriate audio-video aids.
- 14. To provide educational tools for the systematic feedback approach.
- 15. To develop outline-learning resources.
- 16. To provide a technology-assisted environment.
- 17. To integrate technological skills with the art of teaching effectively.
- 18. To manage learning resources(human and non-human).
- 19. To provide a self-paced learning environment to pupils.
- 20. To enhance the digital literature among masses.

1.5.4 Use Of Educational Technology

- 1. **ET creates classroom activities more engaged and fun filled** It can help active participation of an individual in the classroom. It also promotes fun-filled activities and interactive activities using computers and the internet.
- 2. **ET improves collaboration and coordination** Using technology, it is seen to increase in collaborative learning. Techno savvy teachers can train and help other teachers. Students who are good in using technology can give assistance to the peers of their group. In case it leads to effective collaborative learning.
- 3. **ET incorporates different learning styles** Every child in our classroom is different and this is a complex challenge faced by teachers. To overcome this, technology helps teachers to identify learning styles and accordingly modify the lessons and activities with ease.
- 4. **ET innovate teaching methods and strategies** ET overcomes the barriers in traditional classroom teaching methods. Lecture-based methods are getting replaced by innovative methods, strategies and models which in turn gives scope for research and innovation.
- 5. **ET provides Trial- and- error approach** Technology gives students a chance to enhance their curiosity in different ways. Students can try new things without hesitation. ET provides a self-paced learning environment, so it gives students an opportunity to do trial and error by providing immediate feedback. Students can do self-assessment using this approach.

- 6. **ET provides unlimited access to information** ET provides unlimited access to information from any location, at any time with a single click. Instead of going to the library and searching a stack of books they can refer to the vast information by sitting at home. Also, they can access the additional views on the information.
- 7. **ET Provides synchronous and asynchronous learning** It provides the opportunity for synchronous (real-time, face-to-face) learning or Asynchronous (with the pace of student / online) learning.
- 8. **ET embraces digital literacy skills** ET gives an opportunity to students as well as to the educators to deal with new learning trends, technological skills by integrating technology in education. Students will have a sight of technological terms and their applications.
- 9. **ET promotes SLT (Self-Learning Techniques)** Educational Technology gives scope to self-learning. Students learn and access the technology as per their convenience and interest. Students get a chance to do self- study by using SLM (Self Learning Material).

Thus, Educational Technology has a promising future for our country. ET has brought qualitative and quantitative improvement in education.

Check your progress - 1

1. Define Educational Technology.

2. Write a short note on Information Technology.

3. Write a short note on Communication Technology.

1.6 Information and Communication Technology (ICT)

ICT in education is any hardware and software technology that contributes to educational information processing. ICT terms are combined from three different aspects.



(Figure-1.6)

ICT is an approach of teaching and learning where computers are used as aid to establish communication (interaction) in different ways.

In this section let us discuss ICT in detail with its role and significance in teaching learning process.

1.6.1 Concept of ICT

ICT is a technology that includes activities related to information. Such as gathering data, processing data, presenting data and storing data.

The term information refers to the representation of knowledge in the form of facts, texts, pictures, narrations, thoughts. ICT is becoming a lifestyle choice as it is changing the way of communication, way of interaction and way of imparting knowledge. ICTs are becoming a significant part of our future world as it connects to every aspect of our lives. We like to use it for personal growth, innovation, creativity, qualitative and quantitative development.

Let us observe some notable definitions of ICT.

- 1. According to UNDP (United Nations Development Program) "ICTs are basically information handling tools a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information".
- 2. Nick Bostrom "ICT is the fusion of infrastructure and components that enable modern computing."

- 3. According to Mahapatra and Ramesh "ICT is the result of technological convergence of existing single isolated technologies computer technology, communication technology, information processing, publishing technology etc."
- 4. According to UNESCO "ICT is a scientific technological and engineering discipline and management techniques used in handling information and application and association with social, economic and cultural matters".
- 5. Yekini and Lawal (2012) "ICT is a powerful collection of elements which include computer hardware, software, telecommunication networks, workstations, robotics and smart chips which is also at the root of information systems".
- 6. The UK national curriculum document in 2000 defines "ICT as the technology used to handle information and aid communication". From the views of the above definitions, we conclude that ICT is often associated with computer-assisted technologies. ICT is an information handling tool. ICT is a resource which is used to communicate effectively. ICT has become a means that has changed many aspects of the way we live.

ICT uses the following digital technologies:

- 1. Digital camera (Audio/ video conferencing)
- 2. Internet /Intranet
- 3. www
- 4. Online databases
- 5. Discussion forums
- 6. Vlogs, Blogs
- 7. Digital libraries
- 8. Newsgroups
- 9. Chats
- 10. E-books
- 11. E-mails
- 12. Storage devices (CD, DVD, HDD)
- 13. Cell Phones (smart phones)
- 14. E- Journals
- 15. Telecommunications
- 16. Virtual reality
- 17. Interactive TV, Radios
- 18. Projection devices

1.6.2 Objectives of ICT

- 1. To facilitate communication.
- 2. To foster the use of online resources such as discussion forums, blogs, vlogs, emails, chats to share information.

3. To provide distance learning opportunities by providing videoconferencing, tele and audio-conferencing.

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- 4. To provide E-learning facility with the help of electronics media.
- 5. To carry out research and innovations.
- 6. To give opportunities to share and exchange information for professional growth.
- 7. To broadcast learning materials online.
- 8. To support administrative and technical support.
- 9. To act as a learning assistant.
- 10. To promote digital literacy skills.
- 11. To increase a variety of educational services and mediums.

1.6.3 Role of ICT In Higher Education

- 1. Advancement in assessment Assessment in the classical education system was limited to several examinations at the end of completing syllabus. But the adaptation of ICT in higher education makes assessment more manageable and effective. MCQ test, quiz, results, portfolios, work in progress, feedback etc. can be compiled in a desired format.
- 2. **Blended learning** Gives the combination of multiple approaches to learning. This method is useful for higher studies as it includes a mixture of face-to-face learning, self-learning. Higher education mostly emphasizes self-learning approaches.
- 3. **Incorporates collaborative Techniques** It promotes teamwork projects, collaborative learning. Students can discuss topics with their peers. They help each other learn in a safe environment.
- 4. **Instant access to knowledge** uses of the internet gives a chance for a holistic view of any subject content. Students as well as teachers are able to overcome the restriction of one-sided textbook materials. A large amount of information is retrieved and explored as and when required.
- 5. **Learner centered approach** Allows learners to learn effectively and also explore the new things as per their interest.
- 6. Offers educational activities covering large geographical areas.
- 7. **Transformation of education** Online platforms for higher education are MOOC (Massive Open Online Courses, NPTEL (National Program on Technology Enhanced Learning), these kinds of platforms are available for higher education.
- 8. ICT is considered mainstream in higher education. ICTs are being used in many areas such as developing course materials, communication between learners and teachers, delivering content, sharing content, academic research, administrative support and student enrolment. (Mandal and Mete, 2012).
- 9. ICT provides the new experiments in learning.
- 10. Flipped classroom
- 11. Open Educational Resources (OER)

12. Massive Open Online Courses (MOOC)

Thus, we conclude that ICT in higher education improves teachinglearning process and provides online learning facility to learners in an effective way.

1.6.4 Role of ICT In Teacher's Education

- 1. **ICT enhances the efficiency of learning** ICT facilitates the learners to have control on lesson, pace the sequence, content and feedback which improves the efficiency in learning.
- 2 **ICT promotes interactive learning environment -** unlike books, it is interactive in nature and creates motivation and interest among the learners. It includes the individual unique need of a learner.
- 3 **ICT enhances the professional development of teachers** ICT has become an important and integral part of the curriculum of teacher's education. ICT can be used as a tool for training and support of teachers, regardless of geographical area restrictions.
- 4 **ICT helps teachers in Pre- and In-service teachers training -** ICT can make education more efficient and productive, it is a tool used to enhance and facilitate teachers' professional activities. It is essential that pre- and in-service teachers have basic ICT skills and competencies. To obtain these things teachers' education institutions need to plan education programs and make them well prepared to use new tools for learning.
- 5 **ICT is used as an assisting tool** To make assignments, documentations, lesson plans, evaluation sheets, researches, activities, feed backs. ICT can be used independently with different subject matters.
- 6 **ICT promotes teachers to be a facilitator and guide** Now-a-days classrooms have become more learners -centered where teachers are no more leaders but have become facilitator. Technology assists teachers to act as a facilitator by providing the facilities such as digital library, smart board, whiteboards, audio-video chats and E-learning.
- 7 **ICT promotes self-learning in subject matter** Teachers have unlimited access to updated and additional learning resources, ICT enables teachers to do self-learning in subject area.
- 8 **ICT creates OER (Open Educational Resources) for teachers' development** - OERs are the digital materials that can be used, reused for teaching, learning and research and are made available for free(Menon,2014). These OERs are used for teacher's professional development.

ICT helps student teachers to become effective teachers. ICT is one of the major factors for producing the rapid change in the teacher's education programs.

Check your progress: 2

Q. "ICT promotes professional development of teachers". Explain.

1.7 Applications of ICT In Research

ICT helps researchers to perform following tasks:

- Data collection and data analysis
- Choose methods for research
- Qualitative and quantitative analysis
- Literature review
- Collection of information through various online portals
- References
- Access to the national and international journals
- Share the databases and datasets
- To connect and communicate with experts
- Access to free digital libraries
- Write and publish research papers
- Plagiarism detection
- Discussion with researchers

The application of ICTs in academic research has grown in the past years. The most straightforward use of ICTs in research is in data processing. Computer data processing not only frees researchers from the cumbersome task of manually analyzing data but more importantly facilitates quick and accurate analysis of huge amounts of data from national samples or even multi-national samples covering large respondents.

Another important dimension of ICTs in research is the use of online databases and online research libraries/virtual libraries which are the direct

outcome of the growth in tele-communications networks and technology. These databases and libraries provide researchers with online access to the contents of many more books from major publishing houses, research reports, and peer- reviewed articles in electronic journals.

Using ICT-based tools also can reduce research complexity. The reduction of research cost is possible with the use of ICT-based tools because less man hours are required as productivity of researchers has increased.

1.8 Let Us Sum Up

In this unit we have discussed the concepts of Information, and Communication Technology, Education Technology, ICT, role of ICT in higher and teacher education, application of ICT in research. ICT will be the central to learning at all levels in future. Enabling ICT in education creates an easy-to-manage learning environment where the delivery of information is so much easier.

1.9 Unit End Exercise

- Q.1 What is Educational Technology? Explain with its scope.
- Q.2 Write objectives of Educational Technology.
- Q.3 Elaborate Educational Technology with reference to its characteristics.
- Q.4 Explain the utility of ET in education.
- Q.5 Which different digital technologies are used by ICT?
- Q.6 Explain the concept of ICT with reference to its objectives.
- Q.7 Explain the role of ICT in teachers' education.
- Q.8 Analyze the role of ICT in higher education.
- Q.9 "The reduction of research cost is possible with the use of ICT-based tools". Explain

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THEORIES AND PSYCHOLOGICAL PRINCIPLE IN THE ICT ENABLED TEACHING- LEARNING PROCESS

Unit Structure

- 2.0 Objectives
- 2.1 Introduction
- 2.2 Applications of learning theories in e-Learning context: Constructivism and Connectivism
 - 2.2.1 Constructivism
 - 2.2.2 Constructivism in e-Learning
 - 2.2.3 Connectivism
 - 2.2.4 Connectivism in the e-Learning Classrooms
- 2.3 ICT enables environment: Characteristics of e-Learner and e-Learning environment
- 2.4 Psychological principles of ICT enabled classroom learning
- 2.5 Let Us Sum Up
- 2.6 Unit End Exercise
- 2.7 References

2.0 Objectives

- To identify psychological principles of e-learning.
- To analyze the application of select Psychological principles in elearning.
- To understand the learning theories of constructivism and connectivism in an e-learning context.
- To develop the characteristics of an e-learner and e-learning environment.

2.1 Introduction

The introduction of computers is considered by many to be the third revolution in education. The possibility of educational applications was mainly conjectural at that time, although important instructional experiments were conducted throughout the 1950's and 1960's. Computers have brought unprecedented changes in many walks of life and education is no exception. An innovative application of computers in the pedagogy and learning process is e-learning. E- Learning may be network based, intranet based or internet based, which includes text, video, audio, animation and virtual environments. The facility of Internet and Intranet enables e-learning that allows learning anytime and anywhere. E-Learning

Theories and Psychological Principle in the ICT Enabled Teaching- Learning Process

provides faster learning at reduced costs, increased access to learning and clear accountability for all participants in the learning process. The fast budding influence of Information and Communication Technology (ICT) and e-learning in content development and content delivery can be seen in every sector of education. E-Learning can be defined as a broad set of applications and processes which include web-based learning, computer-based learning, virtual classrooms, and digital.

Learning and teaching whether it is through actual classroom settings or through technological applications utilizes many psychological principles knowingly or unknowingly. Some of the predictions about the future of education tend to focus not so much on the technology, but on the intersection between pedagogy and technology, and its effect on psychology, epistemology and teaching praxis. The most commonly used or heard Schools of Psychology are Behaviourism, Cognitivism and Constructivism. The early use of technology in educational settings reflected a behaviorist view of teaching and learning. Behaviorism discusses behaviors that can be observed and does not fully consider the thought processes that go on in the learner's mind. Cognitivism differs from behaviorism in that it deals with the internal mental processes of the mind and how these processes could be used to endorse effective learning. Developments in technology, particularly those evident in multimedia and increased understanding regarding the complexities involved in learning has led to the application of constructivist principles of learning to electronic environments. Constructivism founded on the premise that, by learners reflecting on their experiences, and thereafter constructing their own understanding of their world. All these schools of psychology are developed based on theories formulated by many psychologists and are being effectively applied in actual classroom situations.

2.2 Applications of Learning Theories in E-Learning Context: Constructivism and Connectivism

2.2.1 Constructivism

Constructivism is a theory which suggests that learning is an active process; learners create, synthesize, and apply new concepts based on their current and past knowledge.

Constructivism is the theory that says learners construct knowledge rather than just passively take in information. As people experience the world and reflect upon those experiences, they build their own representations and incorporate new information into their pre-existing knowledge (schemas).

In short, Constructivism is creating experiences that facilitate the construction of knowledge.

Related to this are the processes of assimilation and accommodation.

• Assimilation refers to the process of taking new information and fitting it into an existing schema.

•

Accommodation refers to using newly acquired information to revise and redevelop an existing schema.

For example, if I believe that friends are always nice, and meet a new person who is always nice to me I may call this person a friend, assimilating them into my schema. Perhaps, however, I meet a different person who sometimes pushes me to try harder and is not always nice. I may decide to change my schema to accommodate this person by deciding a friend doesn't always need to be nice if they have my best interests in mind. Further, this may make me reconsider whether the first person still fits into my friend schema.

- Consequences of constructivist theory are that:
- Students learn best when engaged in learning experiences rather than passively receiving information.

Learning is inherently a social process because it is embedded within a social context as students and teachers work together to build knowledge.

Because knowledge cannot be directly imparted to students, the goal of teaching is to provide experiences that facilitate the construction of knowledge.

This last point is worth repeating. A *traditional approach* to teaching focuses on delivering information to students, yet constructivism argues that you cannot directly impart this information. Only an experience can facilitate students to construct their own knowledge. Therefore, the goal of teaching is to design these experiences.

2.2.2 Constructivism In E-Learning

The primary goal of constructivism is the application of learning in a creative way. Constructivism focuses on the process of learning and through this, the outcomes are produced. In constructivism, students have many opportunities to construct their knowledge and express their understanding.

Constructivist learning theory in practice-

In summary, constructivist learning theory encourages educators to do the following:

- Function as a guide or facilitator of learning
- Use realistic and relevant contexts
- Use various modes of representation to make connections with existing knowledge
- Foster self-guided learning
- Embrace social approaches to learning
- Encourage reflection

Constructivist learning theory in e-Learning-

Having considered how these theories have contributed toward education in general, let's explore how they might inform eLearning practices.

Theories and Psychological Principle in the ICT Enabled Teaching- Learning Process

i) Function as a guide or facilitator of learning

With traditional teaching methods, the educator often represents an authoritative source of knowledge. As such, the idea of acting as a 'guide' may require some re-conceptualisation on the educator's part.

In an eLearning context, this means including activities, discussion forums and wikis, for instance, rather than resources that simply disseminate information. This allows learners to collaborate and learn from one another. Combining these resources, or designing activities that require independent research, can also play a facilitative role.

ii) Use realistic and relevant contexts

This is one of the most important principles of constructivist theory. Given the belief that new information is processed based on existing knowledge; it is important for educators to understand what learners already know prior to engaging with the content.

In other words, they should aim to establish new knowledge in a way that builds on existing knowledge. One way of doing this is by using real-world examples that include relatable situations or characters. This also achieves a higher degree of relevance, authenticity and complexity.

iii) Use various modes of representation

Bruner has recommended three modes of representation for facilitating knowledge acquisition:

- Enactive representation (action-based)
- Iconic representation (image-based)
- Symbolic representation (language-based)
- It is important for educators to consider how these modes can be used to draw connections between content. Here, information that is presented symbolically (e.g. in a written format) might be accompanied by pictorial representations (e.g. images or videos). Thereafter, a quiz or interaction can be used to test learners' ability to apply this knowledge. This should result in optimal knowledge acquisition.

iv) Foster self-explorative learning

E-Learning resources (especially those used for assessments) are often highly structured, with a clear learning path set out. Although this guides learners in navigating their learning experiences, it is still possible to encourage self-explorative learning in this scenario. One way of achieving this is by including links to external websites, or adding word-search functions to the learning management system (LMS).

v) Embrace social approaches to learning

Constructivists believe that learning is optimised when it occurs in a social context, rather than in isolation. This can be difficult to achieve in a virtual environment. As such, it is important to identify opportunities to maximise interaction between learners. This is where synchronous learning becomes crucial.

Hosting live-streaming sessions or providing online forums are two options for encouraging learner participation. However, a more organic form of collaboration is likely to result from group activities, workshops or wikis.

vi) Encourage reflection

Finally, constructivist theory encourages reflection on the learning process – which is especially valuable when the process has been one of self-explorative study. Leading questions and blogs are both valuable tools for encouraging reflection in an eLearning context.

Conclusion

Although constructivist learning theory deviates from traditional theories in many ways, these theories are not without value to eLearning practitioners. Traditional theories can still encourage educators to reflect on their own practices, to find ways of achieving understanding and reinforcing knowledge acquisition in their learners. However, constructivism suggests that educators should primarily function as guides, rather than as authoritative sources of knowledge. Ultimately, this means encouraging self-guided exploration, social collaboration and realworld application, rather than developing resources that simply disseminate knowledge.

2.2.3 Connectivism

Connectivism is a learning theory which acknowledges the impact of technology, society, personal networks, and work-related activities. It asserts that learning has changed with the advent of web browsers, search engines, social media, etc.

Connectivism is a relatively new learning theory that suggests students should combine thoughts, theories, and general information in a useful manner. It accepts that technology is a major part of the learning process and that our constant connectedness gives us opportunities to make choices about our learning. It also promotes group collaboration and discussion, allowing for different viewpoints and perspectives when it comes to decision-making, problem-solving, and making sense of information. Connectivism promotes learning that happens outside of an individual, such as through social media, online networks, blogs, or information databases.

Connectivism builds on already-established theories to propose that technology is changing what, how, and where we learn. In their research, Siemens and Downes identified eight principles of connectivism.

Principles of connectivism are:

- Learning and knowledge rests in the diversity of opinions.
- Learning is a process of connecting.
- Learning may reside in non-human appliances.
- Learning is more critical than knowing.
- Nurturing and maintaining connections are needed for continual learning.
- The ability to see connections between fields, ideas, and concepts is a core skill.
- Accurate, up-to-date knowledge is the aim of all connectivist learning.
- Decision-making is a learning process. What we know today might change tomorrow. While there's a right answer now, it might be wrong tomorrow due to the constantly changing information climate.

2.2.4 Connectivism In The E-Learning Classrooms

It's one thing to understand what connectivism is and another to actually incorporate it in the classroom in learning activities. Remember that in a connectivist viewpoint, the new learning responsibilities shift from the teacher to the learner. Unlike traditional teaching methods and other theories like constructivism or cognitivism, the educator's job is to guide students to become effective agents for their own learning and personal development. In other words, it's up to the learner to create their own learning experience, engage in decision making, and enhance their learning networks.

Connectivism relies heavily on technology, so the first step to creating a connectivist classroom is to introduce more opportunities for digital learning—like online courses, webinars, social networks, and blogs.

Here are more ways to incorporate connectivism in the classroom:

• Social media

One way teachers implement connectivism is through the use of classroom social media. For example, classes Twitter account can be used to share information, engage in discussion or announce homework tasks. This can help boost class engagement and open the lines of discussion among students and teachers.

Gamification

Gamification takes assignments and activities and puts them into a competitive game to make learning more of an interactive experience. There are many learning-based apps and instructional technologies teachers can use to add an element of gamification to the classroom. One example is DuoLingo, an online learning tool that helps students learn languages through fun, game-like lessons. Teachers can track students' progress while students can earn "points" for progressing through lessons. Other examples include apps like Brainscape, Virtual Reality House, and Gimkit, just to name a few.

Simulations

Simulations engage students in deep learning that empowers understanding as opposed to surface learning that only requires memorization. They also add interest and fun to a classroom setting. Take, for example, a physics class where students create an electric circuit with an online program. Instead of being instructed via a book or classroom lecture, they're learning about physics by simulating an actual physical setup.

Incorporating some or all of these examples is a great way to allow your students more control over the pacing and content of their learning. It also provides opportunities for individualized learning to match each student's unique needs and strengths.

Conclusion

Both the student and the educator can benefit from connectivism in the classroom. If you're considering adopting this theory in your current or future classroom, consider the following benefits:

• It creates collaboration-

Within connectivism, learning occurs when peers are connected and share opinions, viewpoints, and ideas through a collaborative process. Connectivism allows a community of people to legitimize what they're doing, so knowledge can be spread more quickly through multiple communities.

• It empowers students and teachers

Connectivism shifts the learning responsibilities from the teacher to the student. It's up to the learner to create their own learning experience. The role of the educator then becomes to "create learning ecologies, shape communities, and release learners into the environment" (Siemens, 2003).

• It embraces diversity

Connectivism supports individual perspectives and the diversity of opinions, theoretically providing for no hierarchy in the value of knowledge.

2.3 ICT Enabled Environment: Characteristics of E-Learner and E-Learning Environment

A. Characteristics of E-Learner

i. **Techno savvy learners:** The growth of the World Wide Web, highcapacity corporate networks and high-speed desktop computers will make learning available to people 24 hours a day, seven days a week around the globe. This encourages the learners to be techno savvy and upgrade knowledge of various technologies (social media, eLearning platforms etc.). ii. **Self-Assessment:** Learner-centered eLearning provides opportunities for learners to relate content to their role or personal situation through thought-provoking self-reflective learning checks. Hence, this motivates self-assessment.

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- iii. **Effectiveness of learners and learning:** eLearning has a positive influence; it makes it easy to grasp the content. that give results in improved scores on certifications, tests, and evaluation. It enhances the ability to learn and implement the new processes or knowledge at the workplace. This in turn encourages the learners to learn new technological skills and teach/ update the same to their peers (example: exploring new Teaching-Learning platforms, eBooks portal, etc.) hence making them effective learners.
- iv. Skill of exploring: Learner-centered eLearning is easy to use and enables learners to take control and find what they need quickly. Learners should be able to navigate the course intuitively through course design that implements sound user experience principles. This encourages the learners to explore, learn and enjoy the entire process.

B. Characteristics of E-Learning Environment

The software used for telecommunications, which provides technological means to conduct the educational process, its information support and documentation in the Internet to any number of educational institutions, regardless of their professional expertise and level of education is called the eLearning Environment.

Its characteristics include:

- i. Should provide technological means to conduct the educational process, its information support and documentation in the Internet to any number of educational institutions, regardless of their professional expertise and level of education.
- ii. The e-learning environment also refers to the collaborative interactions used for knowledge acquisition within the online computer mediated digital system.
- iii. The environment should adapt and evolve as per the requirement of the teacher and the learners. It should be able to include the inclusive learning needs of the learner.
- iv. The environment should be open sourced and it should be userfriendly in interface and usage.
- v. The e-learning platforms should have a development that includes all the solutions in the same educational environment for a successful learning experience VIZ student management for all types of learning, enrolment, forums, student communities, virtual classrooms with publication of schedules, reservation of classes, download of course material etc.

vi. As eLearning is a paperless way of learning, so is the eLearning environment. It protects the environment to a lot of extents, there is no need to cut trees for obtaining paper which makes it a highly ecofriendly way of learning.

2.4 Psychological Principles of ICT Enabled Classroom Learning

The following are the psychological principles of learning which are applied to an ICT enabled classroom.

a. Readiness

Readiness implies a degree of concentration and eagerness. Individuals learn best when they are physically, mentally, and emotionally ready to learn, and do not learn well if they see no reason for learning. Getting students ready to learn, creating interest by showing the value of the subject matter, and providing continuous mental or physical challenge, is usually the instructor's responsibility. If students have a strong purpose, a clear objective, and a definite reason for learning something, they make more progress than if they lack motivation. In other words, when students are ready to learn, they meet the instructor at least halfway, simplifying the instructor's job.

Example: For an e-Learning classroom, some simulation game could be played by the teacher and the outcome of the game could make the teacher aware of the readiness of the students.

b. Exercise

The principle of exercise states that those things most often repeated are best remembered. It is the basis of drill and practice. It has been proven that students learn best and retain information longer when they have meaningful practice and repetition. The key here is that the practice must be meaningful. It is clear that practice leads to improvement only when it is followed by positive feedback.

Human memory is fallible. The mind can rarely retain, evaluate, and apply new concepts or practices after a single exposure. Students do not learn complex tasks in a single session. They learn by applying what they have been told and shown. Every time practice occurs, learning continues. These include student recall, review and summary, and manual drill and physical applications. All of these serve to create learning habits. The instructor must repeat important items of subject matter at reasonable intervals, and provide opportunities for students to practice while making sure that this process is directed toward a goal.

Example: In an e-learning setup, lecture recording can be used as an exercise or even a summarization video with a repetition of the examples discussed in the class. This will enable students to retain, evaluate and apply new concepts.

c. Effect

The principle of effect is based on the emotional reaction of the student. It has a direct relationship to motivation. The principle of effect is that learning is strengthened when accompanied by a pleasant or satisfying feeling, and that learning is weakened when associated with an unpleasant feeling. The student will strive to continue doing what provides a pleasant effect to continue learning. Positive reinforcement is more apt to lead to success and motivate the learner, so the instructor should recognize and commend improvement. Whatever the learning situation, it should contain elements that affect the students positively and give them a feeling of satisfaction. Therefore, instructors should be cautious about using punishment in the classroom.

Example: In an e-learning setup, the teacher can use emoticons for positive reinforcement. Things like clap and cheer sounds will also add motivation for the learners.

d. Primacy

Primacy, the state of being first, often creates a strong, almost unshakable, impression. Things learned first create a strong impression in the mind that is difficult to erase. For the instructor, this means that what is taught must be right the first time. For the student, it means that learning must be right. "Un teaching" wrong first impressions are harder than teaching them right the first time. If, for example, a student learns a faulty technique, the instructor will have a difficult task correcting bad habits and "Re-teaching" correct ones.

The student's first experience should be positive, functional, and lay the foundation for all that is to follow. What the student learns must be procedurally correct and applied the very first time. The instructor must present subject matter in a logical order, step by step, making sure the students have already learned the preceding step. If the task is learned in isolation, is not initially applied to the overall performance, or if it must be relearned, the process can be confusing and time consuming. Preparing and following a lesson plan facilitates delivery of the subject matter correctly the first time.

Example: Use for concept maps and flowcharts in e-learning setup really helps to successfully this principle. It not only creates a visual description of the entire lesson, but it also creates a strong impact impression wise.

e. Recency

The principle of recency states that things most recently learned are best remembered. Conversely, the further a student is removed timewise from a new fact or understanding, the more difficult it is to remember. For example, it is fairly easy to recall a telephone number dialed a few minutes ago, but it is usually impossible to recall a new number dialed last week. The closer the training or learning time is to the time of actual need to apply the training; the more apt the learner will be to perform successfully.

Information acquired last generally is remembered best; frequent review and summarization help fix in the mind the material covered. Instructors recognize the principle of recency when they carefully plan a summary for a lesson or learning situation. The instructor repeats, restates, or re emphasizes important points at the end of a lesson to help the student remember them. The principle of recency often determines the sequence of lectures within a course of instruction.

Example: In an ICT based lesson, this principle is most easily accomplished. Summary videos, concept maps of the full lesson can be used to maintain recency of the content taught online.

f. Intensity

The more intense the material taught, the more likely it will be retained. A sharp, clear, vivid, dramatic, or exciting learning experience teaches more than a routine or boring experience. The principle of intensity implies that a student will learn more from the real thing than from a substitute. For example, a student can get more understanding and appreciation of a movie by watching it than by reading the script. Likewise, a student is likely to gain greater understanding of tasks by performing them rather than merely reading about them. The more impressive the learning is upon the student. Real world applications that integrate procedures and tasks that students are capable of learning will make a vivid impression on them.

Example: In an ICT based class, a dramatic voice over over a series of photos could help create intensity of the content. Storytelling using visual aids could be applied for achieving this principle.

g. Freedom

The principle of freedom states that things freely learned are best learned. Conversely, the further a student is coerced, the more difficult it is for him to learn, assimilate and implement what is

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learned. Compulsion and coercion are antithetical to personal growth. The greater the freedom enjoyed by individuals within a society, the greater the intellectual and moral advancement enjoyed by society as a whole.

Since learning is an active process, students must have freedom: freedom of choice, freedom of action, freedom to bear the results of action—these are the three great freedoms that constitute personal responsibility. If no freedom is granted, students may have little interest in learning.

Example: This principle is most easily attained in ICT based learning. Students could be given access to relevant websites for their research on certain concepts to get a deeper understanding. This will motivate freedom to learn, explore and enhance knowledge.

2.5 Let Us Sum Up

In this unit, we have explored the Applications of Learning theories of Constructivism and Connectivism in the e-Learning context. First we saw briefly what these theories mean and then we saw their application in an ICT based classroom.

Then we learned the Characteristics of e-Learner and e-Learning environment which also helped us understand the advantages of elearning. Then we moved on to Psychological principles of ICT enabled classroom learning where we saw the classical principles with their implementation in an ICT enabled classroom.

2.6 Unit End Exercise

- 1. Discuss the ICT based classroom's psychological principles of learning with relevant examples.
- 2. What is Constructivism? Discuss using e-learning as the mode of learning.
- 3. Explain the ways to incorporate connectivism in the classroom?
- 4. Briefly state the characteristics of e-Learner and e-Learning environment.

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3

EMERGING TRENDS IN THE ICT ENABLED TEACHING –LEARNING PROCESS

Unit Structure

- 3.0 Objectives
- 3.1 Introduction
 - 3.1.1 Online Education
 - 3.1.2 Positive and Negative effects of learning online
 - 3.1.3 Future of Online Education
- 3.2 Massive Open Online Courses (MOOC)- Concept
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 - 3 .2.2 Advantages of a MOOC
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 - 3.3.3 E-Learning- Types
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- 3.4 Blended Learning- Introduction
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3.0 Objectives

After reading this unit student will be able to,

- Understand the concept of MOOC and enlist its characteristics.
- Understand the concept of an E-learning process and enlist its characteristics
- Enlist advantages and limitations of E-learning.
- Enumerate types of E-learning
- Apply E-learning types in their in service teaching process.
- Understand the concept of Blended learning
- Explain applications of blended learning in the classroom

3.1 INTRODUCTION

Thanks to the rapid advancement of technology, online learning is a part of many institutions' course offerings around the world. From certificates, PhDs, impactful online language learning and everything in between, learning online has never been so easy!

Offered by some of the world's top-ranked institutions, online learning offers you all the perks of attending your dream university, with the added convenience of a learning experience tailored to your schedule. With courses available in almost every subject, and flexible timetables to suit almost every lifestyle, students are increasingly turning to online learning as a viable alternative to on-campus study. It could allow you to study abroad remotely, at a university not in your home country!

Advances in technology now allow students to study entirely online while still socializing with classmates, watching lectures and participating in subject-specific discussions.

While some consider online learning to require a greater degree of selfmotivation, institutions recognize that educational support is just as important as tutor feedback, and take great care to ensure that their students receive the same levels of support that they would receive on campus.

Online learning is the future of education, discover how it works and why it could be the perfect study abroad option for you!

3. 1.1 Online Education

Online education is a flexible instructional delivery system that encompasses any kind of learning that takes place via the Internet. Online learning gives educators an opportunity to reach students who may not be able to enroll in a traditional classroom course and supports students who need to work on their own schedule and at their own pace.

The quantity of distance learning and online degrees in most disciplines is large and increasing rapidly. Schools and institutions that offer online learning are also increasing in number. Students pursuing degrees via the online approach must be selective to ensure that their coursework is done through a respected and credentialed institution.

3.1.2 Positive And Negative Effects Of Learning Online

Online education offers many positive benefits since students:

- Have flexibility in taking classes and working at their own pace and time.
- Face no commuting or parking hassles.
- Learn to become responsible for their own education with information available at their fingertips.
- Find the submission of assignments easy and convenient.

• Are more apt to voice their own opinions and share and debate issues with other students, as well as learn from other students during the group discussions.

Possible negative effects of learning online are that some students:

- May miss the face-to-face interaction with the instructor and among students.
- May prefer to attend traditional classes with an instructor who teaches and guides them through the course.
- Find access to the necessary technology challenging and the availability of technical support limited.

In addition, some administrators and instructors who do not understand the workload may display a negative attitude toward online education.

3.1.3 Future of Online Education

Online teaching is here to stay. Many students prefer the online classroom since it offers flexibility in their busy schedules. With the proliferation of information and knowledge, students must become lifelong learners in today's world, and online education plays an important role in helping individuals access the learner-centered and self-directed instruction.

With enhanced software, hardware, and Internet access, more options for online education will become available. With student enrollments increasing faster than classrooms can be built, students becoming more proficient with technology, and students pursuing an education that meets their needs, the future of online education will continue to grow. Online degree programs will become more widely accepted as they become a more common practice.

3.2 Massive Open Online Courses (Mooc)- Concept

A massive open online course (MOOC) is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance.

A massive open online course (MOOC) is an online course that has open access and interactive participation by means of the Web. MOOCs provide participants with course materials that are normally used in a conventional education setting - such as examples, lectures, videos, study materials and problem sets. Apart from this, MOOCs offer interactive user forums, which are extremely useful in building a community for students, TAs, and professors.

MOOCs are a recent progression in distance education. The concept of MOOCs originated in 2008 among the open educational resources (OER) movement.

The first MOOCs date back to 2008 with online courses by David Wiley, Utah State University, and Alex Couros, University of Regina. The term Massive Open Online Course was used for the first time by Georges Siemens and Dave Cormier in reference to Stephen Downes and Georges Siemens' "Connectivism and Connective Knowledge" (CCK08) course. The course was given in 2008 at the University of Manitoba, in Canada, and taken by 25 students who attended in-class courses as well as 2,300 Internet users. Course content was cobbled together using various online tools available at the time: a wiki, a blog, RSS feed, Moodle forum, Page flakes, Twitter,. Some students even discussed course material via the Second Life virtual world.

It was not until 2011 that MOOCs would make a name for themselves in the media. Sebastien Thrun and Peter Norvig, respectively Professor at Stanford University and Research Director at Google, announced that one of their courses would be given for free on the internet. In just a few weeks, "Introduction to Artificial Intelligence" had over 160,000 enrollees ready to follow the first lessons. The size and media impact of the course makes it one of the most memorable in the short history of MOOCs.

3.2.1 Massive Open Online Courses (Mooc) - Characteristics

MOOCs are available for everyone. These are free and are usually provided by the most trusted and eminent institutions. These online courses emit certain specific characteristics. So without further ado, let's take a deep dive into the characteristics of MOOCs.

1. MOOCs Use Web Formats

MOOCs heavily depend on web formats and there can be different types of MOOCs depending on the web formats. Most of the video content that is streamed, simulates the presence of a trainer. MOOCs also use live streams to build a virtual classroom. Sometimes, the online trainer can organize live sessions with the students using tools like Ustream or Hangouts. This is an opportunity for the students to get in touch with the trainer, ask questions and clear their queries.

2. Synergetic Learning

MOOCs can easily create an in-class environment that includes the use of collaborative tools. These open courses support the emergence of learning communities and offer a hybrid distribution of knowledge. Every participant can contribute to this and enrich the course. Q&A forums, social media groups, meetups, are used to encourage a synergetic learning environment.

3. Knowledge Assessment

In addition to the content designed to convey information, MOOCs also offer tools to assess the smooth transfer and knowledge retention. These online courses offer a dynamic and interactive environment in the form of multiple-choice questions, essays, programmed tests, and fun-filled quizzes. Apart from that, MOOCs also offer certificates to the learners who complete the courses.

4. Time Limits & Deadlines

Time limitations and deadlines are the final characteristics of MOOCs. These online courses have specified start and end dates.

The course content such as documents, videos, exercises, quizzes, essays, and MCQs (multiple choice questions) is delivered every week. The courseware is spread overtime for the learners. It is also an effective means to ensure that these courses are just like the traditional courses with weekly classes and home assignments.

MOOCs have drastically changed the online education industry. This is opening doors to new learning opportunities, discussion methodologies, and a brighter future for modern learners.

3. 2.2 Advantages Of A Mooc Are As Follows:

- No tuition fees.
- Open access, exposing top level professors at schools that would otherwise be unavailable to much of the World's population.
- Open courses for all interested, regardless of location, resulting in a more diverse student base.
- Collecting data via computer programs helps closely monitor the success and failure of each student. Traditional classroom participation cannot offer this type of precise information.
- Some enthusiastic professors have found global sharing of knowledge more appealing. Many acknowledge that MOOCs help them reevaluate their pedagogical methods, while improving knowledge sharing.

3. 3 E-Learning- Introduction

A learning system based on formalized teaching but with the help of electronic resources 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 delivery of education is made to a large number of recipients at the same or different times. Earlier, it was not accepted wholeheartedly as it was assumed that this system lacked the human element required in learning.

However, with the rapid progress in technology and the advancement in learning systems, it is now embraced by the masses. The introduction of computers was the basis of this revolution and with the passage of time, as we get hooked to smart phones, tablets, etc, these devices now have an important place in the classrooms for learning. Books are gradually getting replaced by electronic educational materials like optical discs or pen drives. Knowledge can also be shared via the Internet, which is accessible 24/7, anywhere, anytime.

3. 3.1 E-Learning - Concept

E-learning is electronic learning. It is a broad term. It has been referred to as computer enhanced education. In many respects the term E-learning is commonly associated with the field of advanced learning technologies (ALT). It deals with both the technologies and associated methodologies in learning using network and or multimedia technologies.

On account of different social backgrounds of pupils and parents, and also on account of different standards of learning and teachers training programmes, teachers cannot deliver the same message to all the learners.

Hence, the need to provide uniform or standardized teaching learning resources or methods. And here we come to web-based learning or e-learning. This is done by introducing or using information technology and related tools in education to all students, including the students from rural areas. Development in internet and multimedia technologies is the basic enablers of e-learning.

E-learning is an umbrella term that encompasses all kinds of learning done through a computer (or a mobile device which is referred to as mlearning), usually connected to a network. Other terms which are frequently interchanged with e-learning include: online learning, Online education, technology enabled learning, web based learning, or computer based learning(usually associated with CD-ROM).

It is now widely accepted that e-learning can be as rich and valuable as classroom learning or even better.

Let us now go through with very few definitions of the term Elearning. These are as follows;

- 1. E-learning refers to using electronic applications and processes to learn.
- 2. E-learning refers to the delivery of learning, training or educational programmes by electronic means.
- 3. E-learning is a type of education where the medium of instruction is computer technology.
- 4. E-learning refers to learning and other supportive resources that are available through a computer.
- 5. E-learning is about information, communication. education and training. Regardless of how trainers categories training and education, the learner only wants the skills and knowledge to do a better job/to answer the next question from a customer.- Tom Kelly, CISCO
- 6. E-learning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance. Rosenberg
- 7. E-learning covers a wide set of applications and processes such as web based learning, computer based learning, virtual classrooms and digital collaboration. It includes the delivery of content via the internet, extranet, audio and videotapes, satellite broadcast, interactive TV and CD-ROM.

3. 3.2 E-Learning- Characteristics

• Characteristics of E-learning

1 Anywhere, anytime, anyone.

The growth of the World Wide Web, high-capacity corporate networks and high-speed desktop computers will make learning available to people 24 hours a day, seven days a week around the globe. This will enable businesses to distribute training and critical information to multiple locations easily and conveniently. Employees can then access training when it is convenient for them, at home or in the office.

2 **Provides reflection opportunities**

Learner-centered eLearning provides opportunities for learners to relate content to their role or personal situation through thoughtprovoking self-reflective learning checks.

3 Effective learning

eLearning has a positive influence, It makes it easy to grasp the content. that give results in improved scores on certifications, tests, and evaluation. it enhances the ability to learn and implement the new processes or knowledge at the workplace. by help in retaining information for a longer time.

4 Friendly, Easy using

Learner-centered eLearning is easy to use and enables learners to take control and find what they need quickly. Learners should be able to navigate the course intuitively through course design that implements sound user experience principles.

5 Personalized learning

In learner-centered eLearning, the content speaks directly to the learner as an individual rather than addressing the learning audience as a group. This helps create the feeling of a personalized learning experience and generates an emotional connection with the content.

6 Less Impact On Environment

As eLearning is a paperless way of learning, it protects the environment to a lot of extents, there is no need to cut trees for obtaining paper. As per a study done on eLearning courses, it has been found that distance-based learning programs consumed around 90% less power and generated 85% less amount of CO2 emissions as compared to traditional campus-based educational courses. With eLearning Thus, eLearning is a highly eco-friendly way of learning.

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Characteristics of successful E-learning courses-

Everyone involved in creating a new e-learning course wants it to be successful. As with all forms and methods of training, however, success is not guaranteed. So, what are the characteristics of a successful e-learning course?

The most important characteristics are in the sections below. However, before you even get into creating the content, visual design, and features, you need to have a clearly defined objective for the e-learning course you are creating.

Without a clearly defined objective, the course is unlikely to achieve the levels of success you want it to achieve, plus you will have nothing to provide you with a meaningful measurement. So, creating this objective should be a priority.

1. Fantastic Appearance and Professional Visuals

The visual design of your course is crucial, as it shows you take the topic and the content seriously. The visual appearance also reflects on your brand and business, plus good design can facilitate the learning process.

2. Distraction-Free Design

As the above point states, good design is essential for successful elearning courses. However, it is possible to go too far with design. This includes adding elements that distract learners.

Successful e-learning courses don't have these distracting elements. Instead, they have white space when there is nothing of substance to fill the area, while everything included in the design is there to enhance the learning process.

3. Good Branding

The e-learning course you are creating will become an asset for your teaching-learning process. It is also a communication tool with your students. Therefore, it should clearly feature your organization's branding.

4. Design Consistency

Staying with the design theme, successful e-learning courses have consistent design throughout. This doesn't just apply to the design and layout of each screen, though, as it also applies to the various content elements that you include, such as graphics and videos. They should also be designed in a way that is consistent with the rest of the course.

5. Interactive Elements

The best e-learning courses are highly interactive, where learners actively participate in the completion of the course. This style of elearning course is much more effective than passive courses where the
learner spends their time reading text, looking at images, and watching videos.

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Those elements are important, too, but you also need elements that are interactive. The best interactive elements are those that let the learner practice what they have learned.

6. Well Structured and Focused Content

The way you structure and present the content in your e-learning course is also critical for ensuring success. Firstly, it should be focused on the topic of the course, and it shouldn't go off on tangents. You can offer learners links and information to other material if they want to explore a related area further, but it is almost always best to keep the content of your course on-topic.

7. Variety of Media

Media elements are important in e-learning, including images, graphs, infographics, videos, and audio elements. They work best when you include various types, especially when you use the most appropriate type of media for the information or concept you are trying to explain. For example, sometimes it will be best to use a graph, while for other concepts, a video will be better.

8. Content That Is Engaging

Engagement is a commonly used measurement of e-learning success, plus engaging courses typically get the best results. Therefore, it is crucial you make the content in your course as engaging as possible.

Following the previous few tips will help, including adding interactive elements and a variety of media.

9. Content That is Challenging

If learners find the content too easy, especially if they feel like they know it already, they will quickly become bored and disengaged. This is not good for them or the success of your e-learning course.

While it may be difficult for some types of e-learning courses, including some compliance-related topics and refresher courses, you will get a much better result if the course is challenging.

10. A Positive, Professional, and Friendly Voice

Tone of voice is important in e-learning course design, as it impacts engagement levels and how learners relate to the content. The voice that should be apparent throughout your course should be professional without being stuffy, positive without being patronizing, and friendly without being informal.

11. On-Demand Availability

One of the biggest benefits of e-learning is that people can complete your course at a time that best suits them. Therefore, you should make

sure you don't do anything during the creation of the course that limits this benefit. For example, check that your course is responsive so it can be completed on any device.

12. Easy Access to Support

Learners complete e-learning courses on their own, but that shouldn't mean they don't have access to support. Instead, support should be available to learners who need it, and it should be clear how to access that support.

13. Putting Everything Together

One of the things the points above demonstrate is that creating a good e-learning course is about more than gathering content and putting it onto a Learning Management System (LMS). There are several crucial elements you should include, plus you need educational, design, and technical skills. Often, the best way to ensure your course is successful is to use a professional e-learning designer. Whatever approach you decide to take, making sure your course features the characteristics above will help make it a success.

3. 3.3 E-Learning - Types

1. Online learning-

Synchronous e-learning: Communication occurs at the same time between individuals and information is accessed instantly. For example- real time charts, audio-video conferencing.

Trainers and trainees do not meet physically, but by using for example a video conferencing system a course is given or students are able to ask questions.

Asynchronous e-learning: It is learning in distance in time where trainers and trainees never meet. Courses are distributed via the internet and communication via email only.

For example- taking a self-paced course, exchanging email messages with a mentor and posting messages about atopic to a discussion group.

2. WWW-(World Wide Web)

It is the computer based network of information resources that a user can move through by using links from one document to another. Information on the WWW is spread over computers all over the world. It is that portion of the internet uses linking HTML pages. It is a collection of text, pictures, sounds, video clips, graphics and other information arranged in pages and linked together via the internet.

A client server software package which uses hypertext to organize, connect and present information and services throughout the internet. A hypertext based system for finding and accessing internet resources.

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3. Discussion Forum-

An area within a website where an internet user can discuss any aspect of a particular topic with other online users around the world.

4. Chat box-

It is a synchronous ,text-based communication via computer between two or more people, typically in real time. Electronic mail is generally not considered chat, because it is not two people writing back and forth in conversation simultaneously, people in online chat sessions type messages to each other using their keyboards. The message then appears on the screens of all participants. Chats can involve two or more people.

5. E-mail-

Electronic mail is the exchange of electronic devices (Computer/ Tab/ Mobile) stored online messages by telecommunication. It allows for the transfer of information from one electronic device to another , provided that they are hooked up via the Internet. It is asynchronous in nature.

Email addresses a unique name that identifies an email recipient. Email addresses take the form username@hostname Wherein the host name is the web mail service provider. Eg. Hotmail, Gmail, Yahoo etc. An email address is a place where someone can contact another person, typically in the format username @host.com/co.in within an enterprise, users can send mail to a single recipient or broadcast it to multiple users. Mail is sent to a simulated mailbox in the network mail server or host computer/ tab/ mobile until it is interrogated and deleted.

6. Off- line learning-

It is defined as "Presenting courses on a computer when it is not connected to a network." The user will only be able to be instructed about the available course and is not able to explore information related to the courses via links or define the learning speed to his/her will. Eg. PC, CD-ROM, Recorded audio-video sessions etc.

3.3.4 E-Learning- Advantages

1. Flexibility, Accessibility, Convenience-

Users are able to proceed through a programme at their own pace. Users can access an e-learning course anytime, anywhere and learn only as much as they need.

2. Cross-platform-

E-learning can be accessed by web browsing software on any machine over the internet or intranet without having to author a programme for each platform.

3. Browser software and Internet are widely available-

Most computers/ tabs/mobile have access to a browser, are connected to organization's Intranet or the internet.

4. Inexpensive worldwide distribution-

There is a need for a separate distribution mechanism.

5. Erase of updating information-

If changes need to be made to a programme or courseware after the first implementation, these changes are made on the servers storing the programme or courseware. Everyone worldwide can instantly access the update of information.

6. Travel costs and time saving-

There are no travel costs and time saving for bringing remote learners to a centralized teaching.

7. Training efficiency is increasing significantly-

Not only from a qualitative standpoint (i.e. pedagogical by the use of a new method, personalization, learner autonomy, memorization and follow-up, operational by learning by opportunity and the speed of the learning updates and organizational by creation of knowledge sharing community) but also from a quantitative standpoint (i.e learning elapse decreases, learning cost may be reduced and learning effectiveness is increasing.)

3.3.5 E-Learning- Limitations

1. Bandwidth limitations-

Limited bandwidth means slower performance for sound, video and intensive graphics, causing long waits for download that can affect the ease of the learning process.

2. Loss of human contact-

There is a general concern that as we move towards more computer usage, a terminal will replace a friendly place. Gradual introduction of e-learning or the use of blended learning may be the answer to this concern.

- 3. **E-learning programmes are too static-** The level of interactivity is often too limited.
- 4. E-learning systems take more time and more money to develop than expected-

This is indeed the case, as it is with any new technology that is implemented. It is easier by starting with an easy programme and building on success.

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5. Not all courses are delivered well by computer-

Some training topics are not best served by computer based training and require a more personal touch. Team building issues and dealing with emotional issues are two examples.

6. Resistance to change-

Introducing an e-learning initiative in an organization is not an easy to do task. Resistance may be hard to overcome , lack of communication and commitment from champions within the organization may jeopardize the chances of a succeeding e-learning initiative.

3. 4. Blended Learning- Introduction

The National Education Policy has given a rare glimpse of what can be achieved through the transformation of education. The new NEP clearly states that it is time to take on a policy that is undoubtedly student centric, or what can be safely put down as Education 4.0! The time has indeed come to recognize the fact that the student is the main stakeholder and that efforts must be taken to make the system respond to their dreams and aspirations. In this line of thinking the new policy gives the acceptability of many modes of learning including that of face to face learning, online learning and distance or virtual mode.

It also promotes use of vocational courses, multi-disciplinary courses and multi-modal approaches there by focusing on Blended teaching-learning. The student centricity means that availability of multiple entry and exit points; promotion of the mother tongue and other languages; focus on the arts and humanities; reforming the examination systems with open book testing and group exams; the ready support for mature learners; and above all the concept of the ABC (Academic Bank of Credit) that factors in the potential of time, place, mode, speed and language that in many ways is going to be the new approach of education.

Technology is a critical element in the whole process and the ABC as currently being evolved understands that. The new teaching –learning and educational processes of the NEP 2020 policy will have to be backed by adequate technologies and blended modes of acquiring knowledge.

A blended learning mode provides ultimate flexibility in many aspects. can be applied to any program which holds on to the values of traditional learning and incorporates digital media with that. It is a lot more effective and likable than anything that has been ever before. needed freedom/flexibility. Only transition from classroom to computer or vice methods and techniques, available resources indicate that blended learning mode is "best of all worlds". It is the best because it helps all learning requirements and styles through a variety of mediums and techniques. Globally have adopted blended learning and is also one of the most adopted learning tools.

3. 4.1 Blended Learning (Bl) - Concept

The definition of blended learning is a method of learning that combines face-to-face and online instruction.

Blended learning is the term given to the educational practice of combining digital learning tools with more traditional classroom face to face teaching. In a true blended learning environment, both the student and the teacher should be physically located in the same space. Despite this, the digital tools used should be able to be utilized by the students in order to enforce some control over the speed or topics of their learning.

The important features of a Blended Learning environment are:

- Increased student engagement in learning.
- Enhanced teacher and student interaction
- Responsibility for learning.
- Time management and flexibility
- Improved student learning outcomes
- Enhanced institutional reputation.
- More flexible teaching and learning environment
- More amenable for self and continuous learning
- Better opportunities for experiential learning
- The advantages of BL for students include increased learning skills, greater access to information, improved satisfaction and learning outcomes, and opportunities both to learn with others and to teach others.

3. 4. 2. Five Blended Learning Models & Platforms-

1. Flipped Classroom

A flipped classroom is a pedagogical model in which the lecture and homework has actually been reversed.

The classroom lecture is viewed at home either through online videos or video podcasts. After viewing an online lecture, the students have the ability to chat with each other through a discussion forum and to note questions that they have from the lecture. The homework is then completed in the classroom and will typically include some type of activity such as collaborative work with a team or a hands-on lab. The teacher is available to interact with the students and act as a guide.

2. Alternative Credit Recovery

PLATO is an example of an online learning option outside of the realms of traditional schooling.

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High school students can remain in school and earn the credits necessary for graduation. The PLATO classroom offers self-paced courses which students can work on completing both inside of the school and at home. There are pre-tests given to place students in the appropriate courses, and they have the opportunity to master the content and meet the rigorous academic standards set by the school district. The course is facilitated by a credentialed teacher, and upon completion the student can earn course credit.

3. Social Media Blending

There are many ways to integrate social media into the classroom setting.By integrating social media; students can show mastery of content through a variety of digital tools such as blogging, Skype, Edmodo or video conferencing. Classmates have the option to constantly share knowledge and interact with each other well beyond the hours spent in the classroom and online discussions can become engaging.

4. **Project-Based Learning**

PBL is a hands-on inquiry and collaborative based learning model in which students seek answers to a real world challenge or problem. It is a relevant and student-driven project completed in the classroom with presentations given to an audience.

If students access content at home–.e.g., researching, compiling data, and general independent work–the majority of their class time can be spent working collaboratively with their teams at school.

5. Moodle

Moodle is a course management system that gives teachers options to post assignments, lectures, videos, and much more. Students can interact with each other through discussion forums, private messaging and chat rooms. Students have the ability to upload completed assignments by attaching files. Grades are added to the grade book on the same site and students can also view feedback given by the teacher. Moodle performs well when used in addition to face-to-face meetings.

3.4.3 blended learning- Application in the classroom

Blended learning offers many opportunities for both the teacher and the student that a traditional brick and mortar classroom may not. With the increasing demands of state standards and busy school days, blended learning permits students to learn a portion of the academic content at home and gives teachers the ability to engage students in a richer, deeper, and more meaningful context in the classroom.

Blended learning enables the teacher to become more of a participant in student learning and can help facilitate student mastery of content with enriching learning activities introduced and completed when the class meets face to face.

Recent research identifies the following key benefits of BL:

- Opportunity for collaboration at a distance: Individual students work together
- Virtually in an intellectual endeavor as a learning practice.
- Increased flexibility: Technology-enabled learning allows for learning anytime and anywhere, letting students learn without the barriers of time and location but with the possible support of inperson engagement. (Any speed, any mode, any language)
- Increased interaction: BL offers a platform to facilitate greater interactivity between students, as well as between students and teachers.
- Enhanced learning: Additional types of learning activities improve engagement and can help students achieve higher and more meaningful levels of learning.
- Learning to be virtual citizens: Learners practice the ability to project themselves socially and academically in an online community of inquiry.
- Digital learning skills are becoming essential to be a lifelong learner, and blended courses help learners master the skills for using a variety of technologies.

Role of Teachers in BL Environment-

BL shifts the teacher's role from knowledge provider to coach and mentor. This shift does not mean that teachers play a passive or less important role in students' education. Quite the contrary—with BL, teachers can have an even more profound influence and effect on students' learning. Traditionally, classroom instruction has largely been teacher-directed, top-down, and one-size-fits-all, with a bit of differentiation thrown in, but with BL, it now becomes more student-driven, bottom-up, and customized, with differentiation as a main feature. Much of this new learning dynamic is due to the enhanced role technology plays in instruction. BL provides an appropriate balance between online instructions, which offers the interactive, tech-based learning, individualized pacing, and privacy that keep students continuously engaged and motivated, and teacher-led instruction, which personalizes the learning experience and adds the human elements of encouragement, compassion, and caring guidance that only teachers can give.

This new learning dynamic benefits students and teachers alike. Giving students permission and space to become active learners who gain knowledge directly lets them assume some control over their learning and helps them develop self-reliance. As more students are working independently, time opens up for teachers to provide face-to-face support and individualized instruction more frequently for more students, effectively improving differentiation. BL provides teachers with a fuller, more accurate picture of how each student is doing. BL yields more frequent and more personal teacher 6 interaction with individual students,

teachers have the opportunity to deepen and strengthen student/teacher relationships.

The trust that comes with close relationships can give teachers insights into students' personal struggles and needs -insights which empower teachers to comfort and coach students through challenges that often serve as obstacles to learning. In summary, BL combines the best aspects of online learning with the best aspects of direct instruction, helping teachers easily manage to do much more to meet student needs without adding to an already weighty workload.

Role of a Learner in the Blended Learning Environment-

- **Increase student interest**: When technology is integrated into school lessons, learners are more likely to be interested in, focused on, and excited about the subjects they are studying.
- Keep students focused for longer: The use of computers to look up information & data is a tremendous lifesaver, combined with access to resources such as the internet to conduct research. This engagement and interaction with the resources keeps students focused for longer periods then they would be with books or paper resources, this engagement also helps develop learning through exploration and research.
- **Provides student autonomy**: The use of eLearning materials increases a student's ability to set appropriate learning goals and take charge of his or her own learning, which develops an ability that will be translatable across all subjects.
- **Instill a disposition of self-advocacy**: Students become self-driven and responsible, tracking their individual achievements, which helps develop the ability to find the resources or get the help they need, self-advocating so they can reach their goals.
- **Promote student ownership**: BL instills a sense of 'student ownership over learning' which can be a powerful force propelling the learning, It's this feeling of responsibility that helps the feeling of ownership. Allow instant diagnostic information and student feedback: The ability to rapidly analyze, review and give feedback to student work, gives the teacher the ability to tailor his teaching methods and feedback for each student while improving time efficiency.
- Enables students to learn at their own pace: Due to the flexibility of BL and the ability to access internet resources allows students to learn at their own pace, meaning a teacher can help speed up the learning process or give more advanced resources if necessary.
- **Prepares students for the future**: BL offers a multitude of realworld skills, that directly translate into life skills, from: Research skills, Self-learning, Self-engagement, Helps to develop a 'selfdriving force', Better decision making, Offers a larger sense of responsibility, Computer literacy.

Blended Learning Structures in Education-

Many factors must be considered when choosing how to blend in-person and online teaching and learning activities. In some cases, most interactions between students and the teacher, as well as the direct delivery of instruction, take place in person in the classroom, while materials and possibly some additional activities are delivered online. In other cases, most of the class activities occur online, with infrequent meetings in person to solve problems and support community building.

In some blended arrangements, students may choose which activities to complete online and which to complete in a classroom. Ideally, blends are personalized so individual students have the blend that best fits their age, life circumstances and learning needs. These are called à la carte models. Students choose what to take fully online, what to take fully in person and, when the design is available, blended courses where they choose when to go to in person classes and when to watch videos, download readings and complete assignments online. This kind of personalization is not always available. Most important is ensuring that students are able to function well as learners with any delivery method, single-mode or blended, even if it is not their preference or the best situation for them.

Teachers are valuable coaches for helping students manage in any learning situation; it is up to teachers and learning designers to offer blended activities that best suit the subject, the learners' needs and the curriculum requirements. Not all unique and interesting BL designs are one-size-fits-all models.

Below are seven sample configurations of BL activities to consider for BL teaching situations. These examples of BL are drawn from higher education but can be shaped to fit any teaching and learning situation.

- Blended face-to-face class Also sometimes called the "face-to-face driver model," the blended face-to-face class model is based in the classroom, although a significant amount of classroom time has been replaced by online activities. Seat time is required for this model, while online activities are used to supplement the in-person classes; readings, quizzes or other assessments are done online at home. This model allows students and faculty to share more high-value instructional time because class time is used for higher-order learning activities such as discussions and group projects.
- **Blended online class** Sometimes referred to as the "online driver model," this class is the inverse of the blended face-to-face class. The class is mostly conducted online, but there are some required inperson activities such as lectures or labs.
- The flipped classroom The flipped classroom reverses the traditional class structure of listening to a lecture in class and completing homework activities at home. Students in flipped classes watch a short lecture video online and come into the classroom to complete activities such as group work, projects or other exercises. The flipped classroom model can be seen as a sub-model of the blended face-to-face or blended online class.

- The rotation model In this model, students in a course rotate between various modalities, one of which is online learning. There are various sub-models: station rotation, lab rotation and individual rotation. Some of these sub-models are better suited to K-12 education; station rotation, for example, requires students to rotate between stations in the classroom at an instructor's discretion. Others work well on a college campus; the lab rotation model, for example, requires students in a course to rotate among locations on campus (at least one of which is an online learning lab). In the individual rotation model, a student rotates through learning modalities on a customized schedule.
- The self-blend model While many of the BL models on this list are at the course level, self-blending is a program -level model and is familiar to many college students. Learners using this model are enrolled in a school but take online courses in addition to their traditional face-to-face courses. They are not directed by a faculty member and choose which courses they will take online and which they will take in person.
- The blended MOOC- The blended MOOC is a form of flipped classroom using in-person class meetings to supplement a massive open online course. Students access MOOC materials perhaps from another institution or instructor if the course is openly accessible outside of class and then come to a class meeting for discussions or in-class activities. In 2012, San Jose State University piloted a blended MOOC using MIT's Circuits and Electronics course, with students taking the MOOC out of class while face-to-face time was used for additional problem solving.
- Flexible-mode courses Flexible-mode courses offer all instruction in multiple modes - in person and online and students choose how to take their course. An example of this is San Francisco State University's hybrid flexible (HyFlex) model, which offers classroom-based and online options for all or most learning activities, allowing students the ability to choose how they will attend classes: online or in person.

3.5 Let Us Sum Up

The National Council for Teacher Education (NCTE) has taken a decision to make Information and Communication Technology(ICT) literacy a compulsory part of Pre service course at the primary and secondary level to help each teacher educator in becoming ICT literate.

In the above chapter we have learned about MOOC as an education system and its characteristics. At a time when retraining and up skilling are the norm, MOOCs give students and professionals the opportunity to continue their education outside a formal university setting. Further the concept of E-learning and Blended learning has greater importance nowadays as the world becomes techno savvy. This teaching and learning methodology cum mode of education is beneficial with its own limitations. For this a teacher must be updated at each level of knowledge explosion in the technological era of education.

3.6 Unit End Exercise

- 1. Explain characteristics of MOOC .
- 2. Distinguish between E-learning and Blended learning.
- 3. Enlist common factors between E-learning and Blended learning.
- 4. Discuss the role of teacher and students in E-learning.
- 5. Discuss the role of teacher and students in E-learning.
- 6. Enlist advantages and disadvantages of E-learning.
- 7. "E-learning is good as well as bad for student's development"-Criticize.

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INSTRUCTIONAL DESIGN

Unit Structure

- 4.0 Objectives
- 4.1 Introduction
- 4.2 Concept of Instructional Design
- 4.3 Models of Instructional Design4.3.1 ADDIE Model of Instructional Design4.3.2 Dick & Carey Model of Instructional Design
- 4.4 Model of E–Learning
- 4.5 Community of Inquiry Model (CoI) (Garrison& Anderson Model (2003)
- 4.6 Let Us Sum Up
- 4.7 Unit End Exercise
- 4.8 References

4.0 Objectives

After reading this unit you will be able to:

- Understand the concept of instructional design
- Know different models of instructional design
- Explain ADDIE model of instructional design
- Compare the ADDIE model &Dick & Carey model of instructional design
- Know different models of e-learning
- Explain Community of inquiry model
- Practice ethically the different instructional design

4.1 Introduction

"Design is concerned with how things work, how they are controlled, and the nature of the interaction between people and technology when done well; the results are brilliant, pleasurable products."

Don Norman

In earlier units you have studied about information and communication technology in education, e-learning, MOOC and blended learning etc. In this unit you will be able to know how all these concepts can be designed well as per the need of the learner in various contexts of learning. This unit "instructional design" consists of two words "instructional" and "design". You know various words like teaching, learning, instruction, direction etc. Teachers are often called instructors because they instruct, give knowledge. Then what is the difference between "teach" and "instruct"? The difference is that a teacher can teach any concept, ideas, theories etc. but in 'instruct' he gives a set of tools or tasks to do something specific. The main purpose here is to learn by doing some activity. Therefore, instructional design is necessary to create cost-effective high-quality learning materials taking into account the strengths and weaknesses of students. So, in this unit we will learn more about the concept and models of instructional design and e-learning.

4.2 Concept of Instructional Design

Thorough planning of imparting instruction in a proper sequence of events is known as instructional design. The meaning of instruction is the creation and implementation of purposefully developed plans for guiding the process by which learners gain knowledge & understanding and develop skills, attitudes, appreciations and values. Instruction is associated with curriculum and refers to the teaching methods and learning activities that a teacher uses to deliver the curriculum in the classroom. You know that in your question paper instruction is given, anything you buy, it is written that read the instructions carefully. So, instruction means detailed information on how one should use something. Instruction in learning and teaching is the purposeful direction of the learning process. Design means the way in which something is planned and arranged for the implementation of a process. So instructional design is the practice of systematically designing, developing and delivering instructional products and experiences both digital and physical, in a consistent and reliable fashion towards an efficient, effective, appealing, engaging and inspiring acquisition of knowledge. The process consists broadly of determining the state and needs of the teachers, defining the end goal of the instruction and creating some "intervention" to assist in the transition. The outcome of the instruction may be directly observable and measurable or hidden and assumed so instructional design is a reliable way of thinking and acting to design quality instruction.

Unwin (1968) has given a comprehensive definition of instructional design:

"Instructional design is concerned with an application of modern skills and techniques for the requirements of education and training; this includes facilitation of learning by manipulation of media, methods and the control of environment so far as this reflects on learning".

Why do we need a good instructional design? We need a good instructional design because of the following characteristics of instructional design.

- It Provides a clear roadmap
- Maximizes learner engagement
- Assigns the right content at the right time
- Evidence based methodologies to help students learn
- Delivers measurable results.

So now you got the idea that instruction is a set of events that facilitates learning. Design is a creative pattern or a rational, logical, sequential process intended to solve problems.

Instructional design is the systematic process of translating general principles of learning and instruction into plans for instructional materials and activities.

So, the need of instructional design is to:

- Identify a performance problem
- Determine the goals and objectives
- Define learners and their needs
- Develop strategies to meet needs and goals
- Assess the learning out comes
- Evaluate if goals, objectives and needs are met.

Then how can we organize an appropriate pedagogical scenario to achieve instructional goals? We need guidelines to organize any work appropriately. An instructional design model provides guidelines. Therefore, we will learn about different instructional design models and discuss some important and useful instructional design models which will help to impart organized information to the right people through the right devices.

4.3 Models of Instructional Design

Instructional models refer to the structure and delivery method of a lesson. It is related to theories about how we learn. To systematically develop improved learning experiences, it is a significant help to apply a process or model that can be followed and counted on to produce a robust solution. There are a number of instructional design models and few have been widely accepted and implemented.

The following is a list of prescriptive instructional design models. Prescriptive models provide guidelines or frameworks to organize and structure the process of creating instructional activities. These models can be used to guide your approach to the art or science of instructional design. The following are commonly accepted prescriptive design models:

- 4C-ID Model (Jeroen van Merriënboer)
- Algo-Heuristic Theory (Lev Landa)
- ADDIE Model
- <u>ARCS</u> (John Keller)
- <u>ASSURE</u> (Heinich, Molenda, Russel, and Smaldino)
- <u>Backward Design</u> (Wiggins & McTighe)
- <u>Cognitive Apprenticeship</u> (Edmondson)
- Conditions of Learning (Robert Gagne)
- Component Display Theory (David Merrill)

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- Criterion Referenced Instruction (Robert Mager)
- Dick and Carey

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- Elaboration Theory
- Gerlach-Ely Model
- Hannafin-Peck Model
- Kirk and Gustafson Model
- Instructional Systems Design ISD
- Integrative Learning Design Framework for Online Learning (Debbaugh)
- <u>Iterative Design</u>
- <u>Kemp Design Model</u> (Morrison, Ross, and Kemp)
- Organizational Elements Model (OEM) (Roger Kaufman)
- <u>Transactional Distance</u> (Michael Moore)
- Cognitive Apprenticeship
- Discovery Learning
- Empathic instructional design
- Goal-based scenarios

In this unit we will discuss the following two models of instructional design widely accepted and used by many.

ADDIE Model

• <u>Dick and Carey Model</u>

4.3.1 ADDIE MODEL

For many years now, educators and instructional designers alike have used the ADDIE Instructional Design (ID) model 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 impose a strict linear progression through the steps. Educators, instructional designers and training developers find this approach very useful because having stages clearly defined facilitates implementation of effective training tools. The concept of Instructional Design can be traced 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 Center for Educational Technology at Florida State University, ADDIE was later implemented across all branches of the U.S. Armed Forces.

The ADDIE method was based on an earlier ID model, the Five Step Approach, which had been developed by the U.S. Air Force. The ADDIE model retained this five-step feature, and included 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. Practitioners over the years have made several revisions in the stages of the original hierarchical version. This has made the model more interactive and dynamic. It was in the mid-1980s that the version similar to the current version appeared. Today, the influence of the ADDIE method can be seen on most ID models being used.



(Figure 4.3.1.1)

The Five Components of the Addie Model Are:

1. Analysis

The Analysis phase can be considered as the "Goal-Setting Stage." The focus of the designer in this phase is on the target audience. It is also here that the program matches the level of skill and intelligence that each student/participant shows. This is to ensure that what they already know won't be duplicated, and that the focus will instead be on topics and lessons that students have yet to explore and learn. In this phase, instructors distinguish between what the students already know and what they should know after completing the course.

Several key components are to be utilized to make sure analysis is thorough. Course texts and documents, syllabi and the internet are to be employed. With the help of online materials such as web courses, a structure can be determined as the primary guide for the syllabus. At the end of the program, instructional analysis will be conducted to determine what subjects or topics are to be included. The Analysis Phase generally addresses the following issues and questions:

- i. What is the typical background of the students/participants who will undergo the program? Personal and educational information such as age, nationality, previous experiences and interests should be determined. What is the target group? What are the educational goals, past knowledge levels, experiences, ages, interests, cultural background etc. of the learners?
- ii. What do the students need to accomplish at the end of the program? What are the learner's needs?

- iii. What will be required in terms of skills, intelligence, outlook and physical/psychological action-reaction? What are the desired learning outcomes in terms of knowledge, skills, attitudes, behavior etc.?
- iv. Determining popular methods being used around the subject and taking a look at what needs to be developed and improved. Review of existing instructional strategies employed. Are they adequate? What aspects need to be added, clarified and improved upon?
- v. Determining target objectives of the project. What instructional goals does the project focus on?
- vi. Determining the various options available with respect to the learning environment. What is the most conducive learning environment? A combination of live or online discussions? What are the Pros and Cons between online- and classroombased study? What delivery option is to be chosen? What type of learning environment is preferred? Does one opt for online or face-to-face or a blend of both? If online is preferred what will be the difference in learning outcomes between classroom-based learning and web-based learning?
- vii. Determining limiting factors to the overall goal of the project. What limiting factors exist with respect to resources, including technical, support, time, human resources, technical skills, financial factors, support factors?

2. Design

This stage determines all goals, tools to be used to gauge performance, various tests, subject matter analysis, planning and resources. In the design phase, the focus is on learning objectives, content, subject matter analysis, exercise, lesson planning, assessment instruments used and media selection.

The approach in this phase should be systematic with a logical, orderly process of identification, development and evaluation of planned strategies which target the attainment of the project's goals. It should follow a very specific set of rules, and each element of the instructional design plan must be executed with attention to detail. This systematic approach makes sure that everything falls within a rational and planned strategy, or set of strategies, that has the ultimate goal of reaching the project's targets. During the design stage, the IDs need to determine:

- i. Different types of media to be used. Audio, Video and Graphics are prime examples. Are third party resources going to be utilized or will the IDs create their own? Will you prepare the teaching learning material?
- ii. Various resources at hand required to complete the project. What are the available resources at your disposal for completing the project?

- iii. Level and types of activity to be generated during the study. Is it going to be collaborative, interactive or on a per participant basis?
- iv. Using a teacher's style approach, how will you implement the parts of the project (i.e. behaviorist, constructivist, etc.)?
- v. Time frame for each activity. How much time is to be assigned to each task, and how will learning be implemented (per lesson, chapter, module, etc.)? Do the topics require a linear progression in presentation (i.e., easy to difficult)?
- vi. The different mental processes needed by the participants in order to meet the targets of the project. What are the prescribed cognitive skills for students to achieve the project's learning goals?
- vii. Knowledge and skill developed after each task. Do you have a way of determining that such values have indeed been achieved by the students? What is the method adopted by you to determine the acquisition of desired competencies by the students?
- viii. The roadmap of how the study or project will appear on paper. Will it be advantageous to the ID to create a map of the different activities to see if they are in line with the goal of the project?
- ix. If the project is web-based, what kind of user interface will you employ? Do you already have an idea on how the site will look?
- x. The feedback mechanism you will use to determine if the participants are able to digest the lessons. What is the mechanism designed by you to obtain the learners' feedback on material learnt?
- xi. Given the wide variety of student preferences and learning styles, what method will you implement to make sure that the program fits their wants? How will you design your project activities so as to appeal to diverse learning styles and interests of students? Will you opt for variety in delivery options and media type?
- xii. Pinpoint the main idea of the project (training activity).

3. Development

The Development stage starts the production and testing of the methodology being used in the project. In this stage, designers make use of the data collected from the two previous 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. This phase includes three tasks, namely drafting, production and evaluation.

Development thus involves creating and testing of learning outcomes. It aims to address the following questions:

- i. Is the time frame being adhered to in relation to what has been accomplished in terms of material? Are you creating materials as per schedule?
- ii. Do you see teamwork across various participants? Are the members working effectively as a team?
- iii. Are participants contributing as per their optimal capacity?
- iv. Are the materials produced up to task on what they were intended for?

4. Implementation

The implementation stage reflects the continuous modification of the program to make sure maximum efficiency and positive results are obtained. Here is where IDs strive to redesign, update, and edit the course in order to ensure that it can be delivered effectively. "Procedure" is the key word here. Much of the real work is done here as IDs and students work hand in hand to train on new tools, so that the design can be continuously evaluated for further improvement. No project should run its course in isolation and in the absence of proper evaluation from the IDs. Since this stage gains much feedback both from IDs and participants alike, much can be learned and addressed.

Design evaluation is done in the implementation phase. Designers play a very active role in this stage, which is crucial for the success of the project. Developers should consistently analyze, redesign and enhance the product to ensure effective product delivery. Meticulous monitoring is a must. Proper evaluation of the product, course or program, with necessary and timely revisions, is done in this phase. When instructors and learners actively contribute during the implementation process, instantaneous modifications can be made to the project, thus making the program more effective and successful.

The following are examples of what can be determined:

- i. Advise on your preferred method of record keeping, as well as the actual data you would like to mine from the experience of students interfacing with the project.
- ii. What is the emotional feedback given to you by teachers and students during the initial demonstration of the project? Are they genuinely interested, eager, critical or resistant?
- iii. As the project proceeds, do you see that IDs are able to grasp the topic immediately or do they need help?
- iv. Explain how you are going to deal with any possible errors during testing. What will your response be if, after presenting activities to students, things do not go as planned?

- v. Did you prepare a back-up tool in the event of initial failure of the project? When technical and other problems arise do you have a back-up strategy?
- vi. Will you go for implementation on a small scale or a large scale?
- vii. When the student group gets the material can they work independently, or is constant guidance required?

5. Evaluation

The last stage of the ADDIE method is Evaluation. This is the stage in which the project is being subjected to meticulous final testing regarding the what, how, why, when of the things that were accomplished (or not accomplished) of the entire project. This phase can be broken down into two parts: Formative and Summative. The initial evaluation actually happens during the development stage. The Formative phase happens while students and IDs are conducting the study, while the Summative portion occurs at the end of the program. The main goal of the evaluation stage is to determine if the goals have been met, and to establish what will be required moving forward in order to further the efficiency and success rate of the project.

Every stage of the ADDIE process involves formative evaluation. This is a multidimensional—and essential—component of the ADDIE process. Evaluation is done throughout the implementation phase with the aid of the instructor and the students. After implementation of a course or program is over, a summative evaluation is done for instructional improvement. Throughout the evaluation phase the designer should ascertain whether problems relevant to the training program are solved, and whether the desired objectives are met.

While often overlooked due to time constraints and monetary reasons, evaluation is an essential step of the whole ADDIE method as it aims to answer the following questions:

- i. Determine the categories that will be established to evaluate the effectiveness of the project (i.e., improved learning, increased motivation etc.) On what factors or criteria will the effectiveness of the project be determined?
- ii. Determine the way you will implement data collection, as well as the timing at which it will be effectively made. When will the data related to the project's overall effectiveness be collected and how?
- iii. Determine a system for analyzing participant feedback.
- iv. Determine the method to be used if some parts of the project need to be changed prior to full release. On what basis will

you arrive at a decision to revise certain aspects of the project before its full implementation?

- v. Determine the method by which reliability and content validity can be observed.
- vi. Determine the method by which you will know if instructions are clear. How is the clarity of instructions assessed?
- vii. Determine the method by which you can analyze and grade the response of the participants on the project.
- viii. Determine who gets to receive your final output regarding the project. Who will prepare this report on the results of the evaluation?

4.3.2 The Dick & Carey Instructional Design Model

It is a nine-step process for planning and designing effective learning initiatives.

It includes all five stages of <u>the ADDIE model</u>, but adds further depth and structure as well. It also has more focus on design and less focus on implementation than the ADDIE model, builds in iterative development through ongoing revision of instruction.



(Figure 4.3.2.1)

1 Identify instructional goals

Your instructional goals set out where you want to get to. In defining them you should align with your organization's strategic goals, be clear on what learners will be able to do, or how they will behave, after your initiative has been delivered and focus on real world skills and behaviors.

2 Conduct instructional analysis

The second stage of the Dick and Carey Instructional Design Model is to conduct instructional analysis.

Your instructional analysis determines the current state of skills and knowledge in your learning population, and through this your gap to your goals. This can be assessed through interviews, surveys, observation or different forms of testing depending on the nature of the skills.

Always take a good look at the people you'll be instructing.

3 Identify entry behaviors

In addition to analyzing your learning population's current level of knowledge, you also need to understand their behaviors, traits, levels of motivation and other factors that will affect their learning journey. This information will help you design appropriate learning methods.

4 Write performance objectives

Learning objectives should be SMART and should lay out tasks and processes that must be mastered and how they will be assessed. These may be known as "SWBAT" in education (Student Will Be Able To).

5 Develop criterion tests

To monitor and evidence both progress and effectiveness of instruction, you need to develop criterion specific tests. These should be of the right format and level for your learning population

6 Develop instruction strategy

Only once you know what your goals, current state, gap, objectives and testing approach are you should define your instructional strategy. It should reflect your analysis and use appropriate learning theories.

Will you use online materials?

7 Develop and select instructional materials

Materials, tools, exercises and delivery media should be decided once you have defined your learning strategy. These may include face to face, group based, facilitated or online learning materials.

8 Develop and conduct formative evaluation

The ultimate stage of The Dick and Carey Instructional Design Model is to develop and conduct formative evaluation. Formative evaluation involves assessing how effectively you have formulated your learning initiative. This can be obtained through review, focus groups, testing of segments and piloting your learning program. Feedback obtained should be used to iterate the initiative.

9 Develop and conduct summative evaluation

Summative evaluation takes place once you have delivered your initiative and is used to assess how effective it has been. Are your participants satisfied with the program? Have knowledge and skills increased because of it? Has the business noticed any benefits due to it?

It is always essential to review results and evaluate performance.

Ongoing Revision

You should continually review and revise throughout your instructional design and development process. Regularly seeking feedback, testing outcomes and iterating through stages of your learning products will help you ensure you deliver the best possible outcomes.

The Dick and Carey instructional design model is more comprehensive than the ADDIE model and addresses some of the risks associated with it.

The increased focus on goals, objectives and testing in this model help ensure that good outcomes are delivered. Similarly, the building in of ongoing revision helps instructional designers think about the development of their learning initiatives as an iterative and ongoing process.

Despite this model's lack of detail in relation to implementation, it's a good model and we recommend at least considering it when deciding how to approach a learning initiative in your organization.

4.4 Model of E-Learning

E-learning has become one of the biggest phenomena of educational literature in recent years. Although the potential promise of e-learning is often expected within the process of learning, much of the emphasis is in fact on the electronic issues to facilitate learning, with little regard for its consequences on the learning process. Very few studies explore students request for such technologies, which begs the question-What problem is e-learning trying to address and whose problem is it? Although we continue to develop sophisticated gadgetry to 'enhance' learning, technology can in fact distract the learner by allowing technology to become more intrusive in the educational experience. Consequently, this often erodes the human factor in learning making the learning process a more isolated experience. Academics should become more cautious with their acceptance of facilitating learning through e-learning platforms without fully understanding the impact on students' learning experiences.

E-learning practitioners may be losing sight of the fundamental role of education and explore some questions on the role of e-learning in education. Consequently, the concerns in the route in which our

educational system is taking, and raises fears of the marketization and mass distribution of education in doing so.

It also explores the changing role of students in discovering, questioning, and seeking

Knowledge of that of 'consumers of pre-packed education.'

E-learning is not very advanced and it supports a 'one size fits all' approach, regardless of what most of the literature promises. The poor implementation of technology can reflect poorly implemented pedagogy, or an overestimation in the learning technology's potential.

Learning is emerging as an important conceptual model towards understanding issues raised by technology and has the potential to transfer increased control to the students. This may suggest a shift in responsibility for learning/teaching without any 'real' evidence to suggest that this enhances the learning process. This begs the question, 'are we merely experimenting with learning tools and technologies for learning, and at what cost to the participant learners?' This leads from the view of learning 'consumption' towards education 'production' Students' representatives must become more involved in the system development of online learning and support techniques. From a student supportive perspective, collaborative peer learning activities should be encouraged or enforced. A system may be implemented where students are awarded with additional marks for contributing to other students' queries. The findings from Carroll (2011) a study conclusively indicates that the current state of online support within the colleges is unsatisfactory, and in need of significant attention, redevelopment, or reinvention. It has also identified the need to introduce methods to enhance the availability of innovative and mobile online support.

There is little evidence to indicate that e-learning improves education in any way except for the 'logistics' or distribution of educational material to a wider student population. There is some concern here as we continue to encourage the evolution of e-learning and we are witness to the change in student behavior towards connectivism within a virtual world and less reliant to partake in face-to-face debate and discussion.

Models of e-learning describe where technology plays a specific role in supporting learning. These can be described both at the level of pedagogical principles and at the level of detailed practice in implementing those principles.

The Community of Inquiry model, the Conversational Framework, and Computer-Mediated Communication form a complementary triad of elearning models that can assist instructors in designing learning tasks that will enhance student learning outcomes through collaborative interaction with peers. In this unit we will know about the community of inquiry model.

4.5 Community of Inquiry (COI) Model (Garrison and Anderson (2003)

One prominent theoretical framework to consider elements of this environment is the Community of Inquiry (CoI) model established by Garrison and Anderson (2003). The CoI model **encapsulates the critical factors within a learning environment**, social, cognitive and teaching presence.

The Community Of Inquiry (CoI) model describes how learning takes place for a group of individual learners through the educational experience that occurs at the intersection of social, cognitive and teaching presence. Communityof Inquiry Model adapted from Garrison and Anderson.

The purpose of the community of inquiry is to build a solid foundation of social presence and teaching presence to stimulate cognitive presence in a course.

Social Presence:

It is the ability of participants to project their individual personalities in order to identify and communicate with the community and develop interpersonal relationships. (Garrison, 2009)

Cognitive Presence:

It is the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse. (Garrison, Anderson, & Archer, 2001, 2004)

Teaching Presence:

It is the design, facilitation, and direction of the social and cognitive processes for the purpose of realizing the relevant learning outcomes (Anderson, Rourke, Garrison, & Archer, 2001).

As depicted in Figure 1, the student's learning experience is central to the sense of community of inquiry, yet the focus is on experience rather than the actual process of learning and tends to adopt a need to facilitate the inquiry but rather 'encourage inquiry through a community (or a collaborative) effort. It is acknowledged that effective learning depends upon the appropriate balance and interaction of all three factors (social, cognitive, and teaching presence). However, there tends to be greater emphasis on social constructivism and a community effort towards learning rather than the raw desire to acquire knowledge on a personal, directed, and individualized basis. It is proposed that this will promote higher-order thinking. Hence, the core problem with this is the acceptability that learners share common or categorized

Instructional Design



Figure 4.4.1. Community of Inquiry (Garrison and Anderson 2003).

Successfully implemented within the electronic environment. The pedagogical principles applied within a traditional classroom environment are extended within an e-learning environment, although technology has a significant influence on pedagogical principles. The rapid development of new learning technologies and tools has paved the way for e-learning (for example, Internet availability, Web 2.0 collaborative tools, and digital multimedia). Teare (1998) argues that it is generally accepted that the dawning of the 'information age' resulted from the phenomenon of growth of personal computer access and ownership during the 1990's. The growth in personal computer access and Internet access has propelled the growth to e-learning which has become a global phenomenon. E-learning continues to experience the resurgence of traditional educational methodologies, as learners take more personal responsibility and control for their own learning needs within the 'modern' educational environment.

4.6 Let us Sum Up

In this unit we have discussed instructional design and various models of instructional design.

Instructional design is the creation of learning experiences and materials in a manner that results in the acquisition and application of knowledge and skills. It provides a framework for the creative process of design and ensures the learners' needs are met. It is important for both face to face and distance education systems.

Instructional design models provide guidelines to organize appropriate pedagogical scenarios to achieve instructional goals.

Types of instructional design models are many. In this unit we have discussed two models named as ADDIE model and Dick and Carey model.

ADDIE model of instructional design is used by instructional designers as part of their online, offline and blended learning sessions. Simply ADDIE stands for five steps:

Analysis, Design, Development, Implementation and Evaluation.

Dick and Carey model

The Dick and Carey Model is an instructional design model taking a systems approach. The model has nine steps:

- 1 Identify instructional goals
- 2 Conduct instructional analysis
- 3 Identify entry behaviors
- 4 Write performance objectives
- 5 Develop criterion tests
- 6 Develop instruction strategy
- 7 Develop and select instructional materials
- 8 Develop and conduct formative evaluation
- 9 Develop and conduct summative evaluation

Models of E-Learning describes where technology plays a specific role in supporting learning. These can be described both at the level of pedagogical principles and at the level of detailed practice in implementing those principles.

The Community of Inquiry model, the Conversational Framework, and Computer-Mediated Communication form a complementary triad of e-learning models that can assist instructors in designing learning tasks that will enhance student learning outcomes through collaborative interaction with peers. In this unit we have discussed the community of inquiry model.

Community of Inquiry (CoI) model (Garrison and Anderson (2003) represents a process of creating a deep and meaningful learning experiences through the development of three independent elements:

Social Presence:

It is the ability of participants to project their individual personalities in order to identify and communicate with the community and develop interpersonal relationships.

Cognitive Presence:

It is the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse.

Teaching Presence

It is the design, facilitation, and direction of the social and cognitive processes for the purpose of realizing the relevant learning outcomes.

Instructional Design

However, In the distance education system, a variety of instructional designs are used to communicate information to students.

Instructional design is a comprehensive and qualitative process that analyses learning needs and goals. It also develops a delivery system to meet the learning needs.

4.7 Unit End Exercise

- 1 Describe the concept of an instructional design.
- 2 Explain the need for using instructional design in the teaching learning process with example.
- 3 Discuss with the help of illustration the various steps of the ADDIE model.
- 4 Describe Dick and Careys's model of instructional design.
- 5 What is the community of inquiry model? Explain which element creates social presence in a community of inquiry model?
- 6 Explain three elements of educational experience in a community of inquiry model with diagram.

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DEVELOPMENT OF INSTRUCTIONAL DESIGN

Unit Structure

- 5.0 Objectives
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 - 5.1.2 Meaning of Instructional Design
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5.0 Objectives

After learning this unit, student will be able to,

- Define the concept of Instructional Design.
- Explain the Stages to be followed in order to develop Instructional Design.
- Design Instruction with the help of Gagne's Nine Events of Instruction.
- Provide you an overview of use of different types of media and choice of media while developing Instructional design.

5.1 What Is Instructional Design?

5.1.1 Brief History of Evolution of Instructional Design

Instructional Design has a very interesting history. The idea of Instructional Design was laid during World War II. During the war, thousands of soldiers needed to be taught certain specific tasks, which were complex and time bound.

Using research from B.F. Skinner's studies in behavioral sciences, the tasks were broken down into smaller tasks, so that the soldiers could comprehend them better and master each step efficiently and quickly. This approach was later taken and built upon leading to the development of instructional design, a field of study that unifies education, psychology and communications to create the most effective teaching plans for specific groups of students.

This is vital because it ensures that students receive instructions in a form that is effective and meaningful to them, helping them better understand the topics and concepts being taught.

5.1.2 Meaning of Instructional Design

From an academic perspective, instructional design is defined as "the systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources, and evaluation."

Simply put, instructional design is the creation of instructional materials. Though, this field goes beyond simply creating teaching materials, it carefully considers how students learn and what materials and methods will most effectively help individuals achieve their academic goals. The principles of instructional design consider how educational tools should be designed, created and delivered to any learning group, from grade school students to adult employees across all industry sectors.

Further, Instructional design is also considered a systematic approach to education that prompts educators to familiarize themselves with the learners in their classroom on a personal level, in order to more comprehensively understand how they learn. Once educators have gathered the Intel about their students, this information is critical to designing personalized lesson plans.

A more comprehensive understanding of Instructional Design is that it is Design, Development and Delivery of learning experiences. It constructs learning experiences in such a way that learners acquire the pre decided knowledge and skills.

Instructional design refers to the deep work of teaching. It focuses on designing instruction that takes teachers deep into content and into consideration of their students' learning. The central idea behind this methodology is that it meets students where they are at, in terms of their experiences inside and outside of the classroom, rather than utilizing a one-size-fits-all lesson plan and expecting students to adapt to it.

Therefore, Instructional Design is also a process of identifying learning needs and developing learning material in order to improve instructions to the learners, thus facilitating learning.

Thus, based on the aforementioned description of Instructional Design, we may say that the process of Instructional Design involves the following:

- Determining the needs of learners,
- Defining the end goals and objectives of instruction,
- Designing and planning assessment tasks, and
- Designing teaching and learning activities to ensure the quality of instruction

In order to achieve as stated above, Instructional Design utilizes basic principles of human learning, specifically the conditions under which the learning occurs. Principles of contiguity, repetition, motivation, interest, attention and reinforcement are utilized to recreate conditions external to the learner that can be incorporated into instruction, which in turn support learner's internal learning processes. Instructional Design has its popularity attributed to its flexible and proactive nature.

Hence, Instructional Design also utilizes the theories of learning and instructional technology in order to facilitate the transfer of knowledge, skills and attitude to the recipient or acquirer of the instruction. Smith and Ragan, 2005 states that Instructional Design is the systematic process of translating a plan of instruction into a set of activities, materials, information and/or assessment procedures.

5.1.3 Summary

Summarizing the discussion till now, we can say that according to Gagné et al., 1992 Instructional Design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs. It includes development of instructional materials and activities, and tryout and evaluation of all instruction and learner activities.

5.2 Stages of Development of Instructional Design

Development of Instructional Design follows several stages. In this section, we shall see one of the most significant and generic ways of developing Instructional Design with the help of an instructional design model.

5.2.1 Introduction

Instructional design is the systematic approach to the Analysis, Design, Development, Implementation and Evaluation of learning materials and activities. Instructional design aims for a learner-centered rather than the traditional teacher-centered approach to instruction, so that effective learning can take place. This means that every component of the instruction is governed by the learning outcomes, which have been determined after a thorough analysis of the learners' needs. These phases sometimes overlap and can be interrelated; however, they provide a dynamic, flexible guideline for developing effective and efficient instruction.

5.2.2 Models of Instructional Design

Instructional design, also known as instructional systems design or knowledge architecture is the analysis of learning needs and systemic development of instruction. Instructional designers often use instructional technology as a method for developing instruction. Instructional design models typically specify a method that, if followed, will facilitate the transfer of knowledge, skills and attitude to the recipient or acquirer of the instruction.

Knowledge, as a social construct, may be created, mediated and revised both in terms of its content and meaning and the way in which it is organized, managed and delivered. Transformative learning is often dependent on ensuring that knowledge content is organized in ways that learners can readily access, assimilate and recall. Models for instructional design provide procedural frameworks for the systematic production of instruction. They incorporate fundamental elements of the instructional design process including analysis of the intended audience or determining goals and objectives. Instructional models prescribe how combinations of instructional strategy components should be integrated to produce a course of instruction.

A variety of Instructional Design models have evolved over the years to represent applications among diverse learner audiences and distinct educational contexts.

The instructional design model provides a step-by-step process that helps training specialists plan and create training programs.

The diagrammatic representation of the above five interlinked phases of the Model is illustrated in the Figure 5.2.3.1



Development of Instructional Design

The instructional design model represents a complete instructional design workflow. It has built-in planning activities, quality assurance checkpoints, and feedback cycles.

The Model is an iterative instructional design process, where the results of the formative evaluation of each phase may lead the instructional designer back to any previous phase. The end product of one phase is the starting product of the next phase.

Table 5.2.3.1 presents an overview of the phases of the model along with the tasks and outputs of every phase.

Table 5.2.3.1

Overview of Phase wise Tasks and Output of Instructional Design Model

Phase	Sample Tasks	Sample Output
<i>Analysis-</i> The process of defining what is to be learned.	 Needs assessment Problem identification Task analysis 	 Learner profile Description of constraints Needs, Problem Statement Task analysis
<i>Design-</i> The process of specifying how it is to be learned	 Write objectives Develop test items Plan instruction Identify resources 	 Measurable objectives Instructional strategy Prototype specifications
Development- The process of authoring and producing the materials	 Work with producers Develop workbook, flowchart program 	 Storyboard Script Exercises Computer assisted instruction
<i>Implementation</i> - The process of installing the project in the real world context	Teacher trainingTryout	Student comments data
<i>Evaluation-</i> The process of determining the adequacy of instruction	 Record time data Interpret test results Survey graduates Revise activities 	 Recommendations Project report Revised prototype

5.2.3 Stages Of Development Of Instructional Design

- 1. The **ANALYZE** phase is the foundation for all other phases of instructional design. During this phase, one must define the problem, identify the source of the problem and determine possible solutions. The phase may include specific research techniques such as needs analysis, job analysis and task analysis. It does not specify exactly all of the components or steps or how each step will be achieved on the road to accomplishing the goal. The outputs of this phase often include the instructional goals, and a list of tasks to be instructed. These outputs will be the inputs for the Design phase.
- 2. The **DESIGN** phase involves using the outputs from the Analyze phase to plan a strategy for developing the instruction. During this phase, one must outline how to reach the instructional goals determined during the Analyze phase and expand the instructional foundation. Some of the elements of the Design Phase may include writing a target population description, conducting a learning analysis, writing objectives and test items, selecting a delivery system, and sequencing the instruction. This is done through a task analysis, which identifies each step and the skills needed in order to complete that step, and an information processing analysis, which identifies the mental operations the learner needs to employ in performing that skill. The task analysis is performed by asking "What are all of the things the student must know and/or be able to do to achieve the goal?"

The outputs of the Design phase will be the inputs for the Develop phase.

- 3. The **DEVELOP** phase builds on both the Analyze and Design phases. The purpose of this phase is to generate the lesson plans and lesson materials. During this phase one will develop the instruction, all media that will be used in the instruction, and any supporting documentation. Current educational theory and research support the use of instructional methods that make students active learners (e.g., lecture lab, small group discussion, case-based study, simulations, independent study, etc.). This may include hardware (e.g., simulation equipment) and software (e.g., computer-based instruction). Although the necessary instructional materials may already exist, they may need improvement or revision.
- 4. The **IMPLEMENTATION** phase refers to the actual delivery of the instruction, whether it's classroom-based, lab-based, or computer-based. The purpose of this phase is the effective and efficient delivery of instruction. This phase must promote the students' understanding of material, support the students' mastery of objectives, and ensure the students' transfer of knowledge from the instructional setting to the job.
- 5. **The EVALUATION** phase measures the effectiveness and efficiency of the instruction. Evaluation should actually occur
throughout the entire instructional design process - within phases, between phases, and after implementation. Evaluation may be Formative or Summative.

Development of Instructional Design

FORMATIVE EVALUATION is ongoing during and between phases. The purpose of this type of evaluation is to improve the instruction before the final version is implemented. It is important to remember that sometimes the plans that look so good on paper actually fail in practice. When possible, test instructional materials with one or a small group of students to determine how students use the materials, how much assistance they need, etc. Considering the teaching methods implemented and the course materials provided are students learning what they should be?

SUMMATIVE EVALUATION usually occurs after the final version of instruction is implemented. This is the evaluation that provides information on how the whole instructional unit enabled the learner to achieve the objectives that were established at the outset. This type of evaluation assesses the overall effectiveness of the instruction. Data from the Summative Evaluation is often used to decide about the instruction.

5.2.4 Check Your Progress

1. Instructional Design is fluid. (A. True /B. False)

2. What are the three components of Analysis according to our Instructional Design Model?

- A. Learning Task
- B. Organizational Strategies
- C. Learners
- D. Formative Evaluation
- E. Learning Contexts

3. At what stage of the design process would you begin to write and produce instruction?

- A. Assessment
- B. Develop
- C. Review
- D. Analysis

- 4. Within Instructional Design, when does revision typically occur?
- A. Throughout the design process.
- B. At the end of the design process
- C. Only after strategies are implemented.
- D. At the end of instruction.

- 5. What are the three basic elements of Instructional Design?
- A. Overview, review, Test
- B. Objectives, Summary, Assess
- C. Analysis, Develop, evaluation
- D. Objectives, content, review

Correct Responses: 1 (B), 2 (A, C & E), 3 (B), 4 (A), 5 (C)

5.3 Events Of Instruction: Gagne's Nine Events Of Instruction

Development of Instructional Design

In 1965, Robert Gagne proposed a series of events that are associated with and address the mental conditions for learning. Understanding this sequence of events, will enable educators to plan their teaching in an effective and efficient manner.

5.3.1 Introduction

Gagne's book, The Conditions of Learning, identified the mental conditions for learning which were based on the information processing model of the mental events that occur when adults are presented with various stimuli. Each of the nine events of instruction is highlighted below, followed by sample methods to help implement the events in your own instruction. Gagne created a nine-step process called the events of instruction, which correlate to and address the conditions of learning. Keeping these stages in mind as you plan for a class session or online module can give your lesson plans a strong foundation.

5.3.2 Gagne's Nine Events Of Instruction

The following steps have been adapted from Gagné, Briggs, and Wager (1992).

1. Gain attention of the students

Ensure the learners are ready to learn and participate in activities by presenting a stimulus to capture their attention.

These are a few methods for capturing learners' attention:

- Stimulate students with novelty, uncertainty and surprise
- Pose thought-provoking questions to students
- Have students pose questions to be answered by other students
- Lead an ice breaker activity

2. Inform students of the objectives

Inform students of the objectives or outcomes for the course and individual lessons to help them understand what they are expected to learn and do. Provide objectives before instruction begins.

Here are some methods for stating the outcomes:

- Describe required performance
- Describe criteria for standard performance
- Have learners establish criteria for standard performance
- Include course objectives on assessment prompts

Inform students of the objectives or outcomes for the course and individual lessons to help them understand what they are expected to learn and do.

3. Stimulate recall of prior learning

Help students make sense of new information by relating it to something they already know or something they have already experienced.

There are numerous methods for stimulating recall:

- Ask questions about previous experiences
- Ask students about their understanding of previous concepts
- Relate previous course information to the current topic
- Have students incorporate prior learning into current activities

4. Present the content

Use strategies to present and cue lesson content to provide more effective instruction. Organize and group content in meaningful ways and provide explanations after demonstrations.

The following are ways to present and cue lesson content:

- Present multiple versions of the same content (e.g. video, demonstration, lecture, podcast, group work, etc.)
- Use a variety of media to engage students in learning
- Incorporate active learning strategies to keep students involved
- Provide access to content on Blackboard so students can access it outside of class

5. Provide learning guidance

Advise students of strategies to aid them in learning content and of resources available. In other words, help students learn how to learn.

The following are examples of methods for providing learning guidance:

- Provide instructional support as needed i.e. scaffolding that can be removed slowly as the student learns and masters the task or content
- Model varied learning strategies e.g., mnemonics, concept mapping, role playing, visualizing
- Use examples and non-examples examples help students see what to do, while non-examples help students see what not to do
- Provide case studies, visual images, analogies, and metaphors – Case studies provide real world application, visual images assist in making visual associations, and analogies and metaphors use familiar content to help students connect with new concepts

6. Elicit performance (Practice)

Have students apply what they have learned to reinforce new skills and knowledge and to confirm correct understanding of course concepts.

Here are a few ways to activate learner processing:

- Facilitate student activities e.g., ask deep-learning questions, have students collaborate with their peers, facilitate practical laboratory exercises
- Provide formative assessment opportunities e.g., written assignments, individual or group projects, presentations
- Design effective quizzes and tests i.e., test students in ways that allow them to demonstrate their comprehension and application of course concepts (as opposed to simply memorization and recall)

7. Provide feedback

Provide timely feedback of students' performance to assess and facilitate learning and to allow students to identify gaps in understanding before it is too late.

The following are some types of feedback you may provide to students:

- Confirmatory feedback informs the student that they did what they were supposed to do. This type of feedback does not tell the student what she needs to improve, but it encourages the learner.
- Evaluative feedback apprises the student of the accuracy of their performance or response but does not provide guidance on how to progress.
- Remedial feedback directs students to find the correct answer but does not provide the correct answer.
- Descriptive or analytic feedback provides the student with suggestions, directives, and information to help them improve their performance.
- Peer-evaluation and self-evaluation help learners identify learning gaps and performance shortcomings in their own and peers' work.
- Provide timely feedback of students' performance to assess and facilitate learning and to allow students to identify gaps in understanding.

8. Assess performance

Test whether the expected learning outcomes have been achieved on previously stated course objectives.

Some methods for testing learning include the following:

• Administer pre- and post-tests to check for progression of competency in content or skills

- Embed formative assessment opportunities throughout instruction using oral questioning, short active learning activities, or quizzes
- Implement a variety of assessment methods to provide students with multiple opportunities to demonstrate proficiency
- Craft objective, effective rubrics to assess written assignments, projects, or presentations
- Implement a variety of assessment methods to provide students with multiple opportunities to demonstrate proficiency.

9. Enhance retention and transfer

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Help learners retain more information by providing them opportunities to connect course concepts to potential real-world applications.

The following are methods to help learners internalize new knowledge:

- Avoid isolating course content. Associate course concepts with prior (and future) concepts and build upon prior (and preview future) learning to reinforce connections.
- Continually incorporate questions from previous tests in subsequent examinations to reinforce course information.
- Have students convert information learned in one format into another format (e.g. verbal or visuospatial). For instance, requiring students to create a concept map to represent connections between ideas (Halpern And Hakel, 2003, p. 39).
- To promote deep learning, clearly articulate your lesson goals, use your specific goals to guide your instructional design, and align learning activities to lesson goals (Halpern And Hakel, 2003, p. 41).

5.3.3 Summary

Gagne's nine events of instruction can help you build a framework to prepare and deliver instructional content while considering and addressing conditions for learning. Ideally, you should prepare course goals and learning objectives before implementing the nine events—the goals and objectives will help situate the events in their proper context. The nine events of instruction can then be modified to fit both the content and students' level of knowledge.

5.3.4 Check Your Progress

1. Lead an ice breaker activity is a part of _____.

A. Enhance retention and transfer

- B. Elicit performance (practice)
- C. Stimulate recall of prior learning
- D. Gain attention of the students

- 2. Presenting multiple versions of the same content (e.g. video, demonstration, lecture, podcast, group work, etc.) is a part of
 - A. Gain attention of the students.
 - B. Inform students of the objectives.
 - C. Stimulate recall of prior learning.
 - D. Present the content.
- 3. Implement a variety of assessment methods to provide students with multiple opportunities to demonstrate proficiency
 - A. Assess performance.
 - B. Elicit performance (practice)
 - C. Provide feedback.
 - D. Provide learning guidance.
- 4. Peer-evaluation and self-evaluation is a part of
 - A. Assess performance.
 - B. Elicit performance (practice)
 - C. Provide feedback.
 - D. Provide learning guidance.
- 5. Mnemonics, concept mapping, role playing, visualizing
 - A. Assess performance.
 - B. Elicit performance (practice)
 - C. Provide feedback.
 - D. Provide learning guidance.

Correct Responses: 1 (D), 2 (D), 3 (C), 4 (C), 5 (D)

5.4 Use Of Media: Types Of Media And Choice Of Media

In the world of education, technology and media are often mistakenly viewed as being one and the same. However, instructional designers understand the two are different and will benefit from useful tips on the selection of instructional media. The following section will discuss these differences between technology and media and offer tips on selecting and recommending instructional media while keeping in mind the importance of aligning media selection with the designated instructional goals of the course

5.4.1 Introduction

When selecting media, it is always important to remember the entrance (prerequisite) skills of the student as well as the technological skills of the instructor and to determine whether you will need to incorporate instructions on the use of the selected media within the course to assist the learner in the use of the chosen media or to develop an instructor media guide to assist the instructor in the use of the media. Will students be able to navigate the instructional media effectively and efficiently? Will the instructor be able to assist their students in how to navigate the instructional media? Applying a learner centric perspective as you evaluate & select instructional media will bring greater success in the student learning outcomes.

5.4.2 Media And Technology

Instructional designers have many opportunities to recommend to an instructor appropriate media for implementing the instructional strategies. Selecting the appropriate media mix can be often challenging and is a critical component of the instructional design process. This section will address some guidelines for selecting instructional media.



(Figure-5.4.2.1)

Many various forms of technology are depicted in this photo. Do you think each of these could be used in the classroom? If so,how? If not, which ones are not appropriate for the classroom and why?

What is the difference between media and technology? Philosophers and scientists have argued about the nature of media and technologies over a very long period. The distinction is challenging because in everyday language use, we tend to use these two terms interchangeably. For instance, television is often referred to as both a medium and a technology. Is the Internet a medium or a technology? And does it matter?

There are differences, and it does matter to distinguish between media and technology, especially if we are looking for guidelines on when and how to use them. The terms 'media' and 'technology' represent different ways altogether of thinking about the choice and use of technology in teaching and learning.

5.4.2.1 Technology

There are many definitions of technology. Essentially definitions of technology range from the basic notion of tools to systems which employ or exploit technologies. Thus, 'technology refers to tools and a machine that may be used to solve real-world problems is a simple definition.

In terms of educational technology, we have to consider a broad definition of technology. The technology of the Internet involves more than just a collection of tools, but a system that combines computers, telecommunications, software and rules and procedures or protocols.

Educational technology is seen as tools used to support teaching and learning. Thus, computers, software programs such as a learning management system, or a transmission or communications network, are all technologies. A printed book is a technology. Technology often includes a combination of tools with particular technical links that enable them to work as a technology system, such as the telephone network or the Internet.

Technologies or even technological systems do not themselves communicate or create meaning. They just sit there until commanded to do something or until they are activated or until a person starts to interact with the technology. At this point, we start to move into the media.

5.4.2.2 Media

Media (plural of medium) is another word that has many definitions, and it has two distinct meanings relevant for teaching and learning, both of which are different from definitions of technology.

The word 'medium' comes from the Latin, meaning in the middle (a median) and also that which intermediates or interprets. Media can be defined as requiring the active creation of content and/or communication, and someone who receives and understands the communication, as well as the technologies that carry the medium.

We use our senses, such as sound and sight, to interpret media. In this sense, we can consider text, graphics, audio and video as media 'channels', in that they are intermediate ideas and images that convey meaning. Every interaction we have with media, in this sense, is an interpretation of reality, and again usually involves some form of human intervention, such as writing (for text), drawing or design for graphics, talking, scripting or recording for audio and video. Note that there are two types of intervention in media: by the 'creator' who constructs information, and by the 'receiver', who must also interpret it.

Media of course depends on technology, but technology is only one element of media. Thus, we can think of the Internet as merely a technological system, or as a medium that contains unique formats and symbol systems that help convey meaning and knowledge. These formats, symbol systems and unique characteristics are deliberately created and need to be interpreted by both creators and end users.

Computing can also be considered a medium in this context. Computing as a medium would include animations, online social networking, using a

search engine, or designing and using simulations. Thus, the creation, communication and interpretation of meaning are added features that turn a technology into a medium.

5.4.3 Types Of Media

Thus, based on the discussion done in previous section, in terms of representing knowledge we can think of the following media for educational purposes:

- Text
- Graphics
- Audio
- Video
- Computing

Within each of these media, there are subsystems, such as;

- Text: textbooks, novels, poems
- Graphics: diagrams, photographs, drawings, posters, graffiti
- Audio: sounds, speech
- Video: television programs, YouTube clips, 'talking heads'
- Computing: animation, simulations, online discussion forums, virtual worlds.

In education we could think of classroom teaching as a medium. Technology or tools are used (e.g. chalk and blackboards, or PowerPoint and a projector) but the key component is the intervention of the teacher and the interaction with the learners in real time and in a fixed time and place. We can also then think of online teaching as a different medium, with computers, the Internet (in the sense of the communication network) and a learning management system as core technologies, but it is the interaction between teachers, learners and online resources within the unique context of the Internet that are the essential component of online learning.

From an educational perspective, it is important to understand that media are not neutral or 'objective' in how they convey knowledge. They can be designed or used in such a way as to influence (for good or bad) the interpretation of meaning and hence our understanding. Some knowledge therefore of how media work is essential for teaching in a digital age. In particular we need to know how best to design and apply media (rather than technology) to facilitate learning.

Over time, media have become more complex, with newer media (e.g. television) incorporating some of the components of earlier media (e.g. audio) as well as adding another medium (video). Digital media and the Internet increasingly are incorporating and integrating all previous media, such as text, audio, and video, and adding new media components, such as animation, simulation, and interactivity. When digital media incorporate many of these components they become 'rich media'. Thus, one major advantage of the Internet is that it encompasses all the representational media of text, graphics, audio, video and computing

5.4.4 Choice Of Media

Different media can be used to assist learners to learn in different ways and achieve different outcomes.

Perhaps even more important is the idea that many media are better than one. This allows learners with different preferences for learning to be accommodated, and to allow subject matter to be taught in different ways through different media, thus leading to deeper understanding or a wider range of skills in using content. On the other hand, this increases costs.

Online learning can incorporate a range of different media: text, graphics, audio, video, animation, simulations. The use of different media also allows for more individualization and personalization of the learning, better suiting learners with different learning styles and needs.

If we are interested in selecting appropriate technologies for teaching and learning, we should not just look at the technical features of a technology, nor even the wider technology system in which it is located, nor even the educational beliefs we bring as a classroom teacher. We also need to examine the unique features of different media, in terms of their formats, symbols systems, and cultural values. These unique features are increasingly referred to as the affordances of media or technology.

As new technologies are developed, and are incorporated into media systems, old formats and approaches are carried over from older to newer media. Education is no exception. New technology is 'accommodated' to old formats, as with clickers and lecture capture, or we try to create the classroom in virtual space, as with learning management systems. However, new formats, symbols systems and organizational structures that exploit the unique characteristics of the Internet as a medium are gradually being discovered. It is sometimes difficult to see these unique characteristics clearly at this point in time. However, e-portfolios, mobile learning, open educational resources such as animations or simulations, and self-managed learning in large, online social groups are all examples of ways in which we are gradually developing the unique 'affordances' of the Internet.

More significantly, it is likely to be a major mistake to use computers to replace or substitute for humans in the educational process, given the need to create and interpret meaning when using media, at least until computers have much greater facility to recognize, understand and apply semantics, value systems, and organizational features, which are all important components of 'reading' different media. But at the same time, it is equally a mistake to rely only on the symbol systems, cultural values and organizational structures of classroom teaching as the means of judging the effectiveness or appropriateness of the Internet as an educational medium.

Thus, we need a much better understanding of the strengths and limitations of different media for teaching purposes if we are to select the right medium for the job. However, given the widely different contextual factors influencing learning, the task of media and technology selection becomes infinitely complex. This is why it has proved impossible to develop simple algorithms or decision trees for effective decision making in this area. Nevertheless, there are some guidelines that can be used for identifying the best use of different media within an Internet-dependent society.

A major part of instructional design is selecting the appropriate media mix to effectively teach the learning outcome(s). Selecting the best media mix increases learning and maximizes cost-effectiveness. Some concepts are extremely difficult to teach without the correct media mix. This section of the chapter explains how each medium relates to learning and describes how media can affect a learner's motivation. The strengths and weaknesses of each medium are presented with respect to the different learning outcome classifications.

The media categories you can include in an online course are:

- 1. Text: Text is typically presented on computer screens but the resources you provide can also include print-based materials. It is particularly important for you to make text understandable when students are learning at a distance.
- 2. Audio: Audio can be heard from DVD-ROM/CD-ROM disks, computer hard drives, an intranet, and the Internet. However, an online course can also include resources like tapes (audio cassettes), radio, television, and live commentary.
- **3. Visuals**: Visuals can be stored on DVD-ROM/CD-ROM disks, computer hard drives, an intranet, and the Internet. Other resources can include slides, photographs, overhead transparencies, and paper based material.
- 4. Video: Video can be retrieved from DVD-ROM/CD ROM disks, computer hard drives, an intranet, and the Internet. Other sources can include mini DVD, tapes, film, and VHS tapes. Video typically includes natural images recorded with video equipment, whereas animations are usually created artificially with computers and/or other models. Video often includes an audio component.
- **5. Animations:** Animations can be stored on DVD-ROM/CD-ROM disks, computer hard drives, an intranet, and the Internet. Film, VHS tapes and other sources can also contain animation resources.
- 6. Real objects: Real objects include actual equipment and models.

The media you select does not determine whether learning will occur. The media you use can influence the amount of learning that occurs. If you combine the media's strengths with instructional methods that take advantage of these strengths, you can positively influence learning. Complete instructional packages can, but should not necessarily, include all of the different media. It is important to note that Learning from course content that includes more than one medium is usually more effective than content using only one medium. This is partly because different parts of the brain process text, while others process visuals. When instructional

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materials activate more regions of the brain, there are increases in learning and retention compared to materials that require fewer parts of the brain to process information.

In many situations, you can and should use more than one medium to teach the skill. You will need to determine the media that will complement the intended instructional strategy. If you use too many media at one time, you can impede learning. Although multi-sensory learning experiences tend to be effective, learners can only process a limited amount of information at one time. Imagine trying to read text while a supporting animation is being shown on the screen. Media should support and enhance each other. Base your media mix decision on what is being taught, how it is being taught, how it will be tested, and the characteristics of your target audience.

Different media may be needed for different learning outcomes. For example, video may be appropriate for the attitude component but may not provide the corrective feedback necessary for the intellectual skills component. Do not select media simply to dazzle or for convenience.

But how rich should the media be for teaching and learning? From a teaching perspective, rich media have advantages over a single medium of communication, because rich media enable the teacher to do more. For example, many activities that previously required learners to be present at a particular time and place to observe processes or procedures such as demonstrating mathematical reasoning, experiments, medical procedures, or stripping a carburetor, can now be recorded and made available to learners to view at any time. Sometimes, phenomena that are too expensive or too difficult to show in a classroom can be shown through animation, simulations, video recordings or virtual reality.

Furthermore, each learner can get the same view as all the other learners and can view the process many times until they have mastery. Good preparation before recording can ensure that the processes are demonstrated correctly and clearly. The combination of voice over video enables learning through multiple senses. Even simple combinations, such as the use of audio over a sequence of still frames in a text, have been found more effective than learning through a single medium of communication (see for instance, Durbridge, 1984). The Khan Academy videos have exploited very effectively the power of audio combined with dynamic graphics. Computing adds another element of richness, in the ability to network learners or to respond to learner input.

From a learner's perspective, though, some caution is needed with rich media. Two particularly important concepts are cognitive overload and Vygotsky's Zone of Proximal Development. Cognitive overload results when students are presented with too much information at too complex a level or too quickly for them to properly absorb it (Sweller, 1988). Vygotsky's Zone of Proximal Development or ZPD is the difference between what a learner can do without help and what can be done with help. Rich media may contain a great deal of information compressed into a very short time period and its value will depend to a large extent on the learner's level of preparation for interpreting it.

For instance, a documentary video may be valuable for demonstrating the complexity of human behavior or complex industrial systems, but learners may need either preparation in terms of what to look for or to identify concepts or principles that may be illustrated within the documentary. On the other hand, interpretation of rich media is a skill that can be explicitly taught through demonstration and examples (Bates and Gallagher, 1977). Although YouTube videos are limited in length to around eight minutes mainly for technical reasons, they are also more easily absorbed than a continuous video of 50 minutes. Thus again design is important for helping learners to make full educational use of rich media.

It is a natural tendency when choosing media for teaching to opt for the 'richest' or most powerful medium. Why would I use a podcast rather than a video? There are in fact several reasons:

Cost and ease of use: it may just be quicker and simpler to use a podcast, especially if it can achieve the same learning objective; there may be too many distractions in a rich medium for students to grasp the essential point of the teaching. For instance, video recording a busy intersection to look at traffic flow may include all kinds of distractions for the viewer from the actual observation of traffic patterns. A simple diagram or an animation that focuses only on the phenomenon to be observed might be better; the rich medium may be inappropriate for the learning task. For instance, if students are to follow and critique a particular argument or chain of reasoning, text may work better than a video of a lecturer with annoying mannerisms talking about the chain of reasoning.

Here are a few practical guidelines on the selection and use of instructional media:

- Text is better than video and audio when the topic is complex. Text is especially effective for verbal skills such as describing, listing, and naming. With proficient readers, verbal information can usually be learned faster with text than with other media. For higher-level skills, remember that practice and feedback are particularly critical. Text is often a major component of effective practice and feedback.
- Make text understandable and clear, avoid excessive wording.
- Minimize reading- Minimizing reading helps students with weak reading abilities and those with disabilities.
- Develop a good writing style, following basic writing principles. Keep writing naturally and use active verbs.
- Keep in mind if any instructional materials you develop are computer based that the best location for a key point, such as a formula, is the screen's upper left area. Poor areas for key points are the screen's top right and bottom left. This is because people read English from the left to right and top to bottom. Since people tend to focus on a curved path along the screen, the top left is the best location to be seen and understood.

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- For the best readability, you should justify paragraphs. In general, you should avoid full justification. Full justification is harder to read than left-justified text.
- Choose a font that is clear and easily readable such as Arial, Helvetica, or Times New Roman. Although some people may call these fonts ``boring" or "unattractive", readability is critical for online applications — especially when students will read text for longer time periods.
- Hypertext is text that is linked to other information. Hypertext allows learners to quickly get more information by activating, such as by clicking a mouse over highlighted parts of the screen. Highlighted active words are sometimes called "Hot words". Hypermedia goes beyond hypertext by providing access to a variety of media. Since links often lead to other links, the links are like a three-dimensional web. In general, hypertext and hypermedia applications simply provide access to information rather than teaching specific learning outcomes. hypertext and hypermedia can be weak from an instructional perspective. For learning to occur in hypertext and hypermedia environments, learning should be specifically planned and guided.
- You can use audio to effectively teach many skills such as attitudes, especially if you personalize the material. Audio is also effective for teaching intellectual skills such as learning languages. You can also use audio to gain attention, give feedback, give directions, personalize computers, provide realism such as through presenting actual speeches, make annotations, teach the pronunciation of new words, provide multilingual support, accommodate non-readers, and provide meaning for images. You should also supplement audio with effective preparatory and follow-up activities. An advantage of audio over text is that listening is much easier than reading.

You can use audio effectively for students who are visually impaired and those with poor reading abilities. For those with poor reading abilities, one solution is to provide text but let students click on an audio button whenever they want to hear a narration of the text. Although this strategy is useful for some students, many learners find this annoying. Audio can be problematic when played at a different speed than the student is able to read.

• Animation is another medium that you can incorporate into your online courses. It is important for you to consider using animations as a part of the instructional strategy since animations can significantly enhance learning, motivation, and attitudes as well as reduce the time needed for learning. Animation means "to give life to" something. Animations, which are a series of visuals that change over time, are like video sequences except that animations are created with a computer, other tools, or manually rather than by filming real objects in motion. For this reason, a video can be easier to make than an animation.

- A major part of the instructional design process you need to do is select the appropriate media mix to effectively teach the learning outcome(s). Selecting the best media mix will enable you to increase learning. Learning from course content made with more than one medium is usually more effective than content composed of only one medium. In many situations, you can and should use more than one medium to teach the skill. However, remember that if you use too many media at one time, you can impede learning. Base your media mix decision on the learning outcomes, how they are being taught, and how testing will be done. To be successful, students must also have the skills to extract information and learn from the media. You may also need to motivate your students to learn from the media selected.
- Remember that the media mix you choose must be able to meet the requirements of the instructional strategy and address all of the instructional events. In particular, the media mix must effectively teach all of the learning outcomes and should allow for practice and feedback.
- For verbal information such as knowledge and comprehension, you should use text and visuals. Remember to use the computer to provide interaction as that can be difficult or cumbersome to do with paper-based materials.
- For intellectual skills such as applying skills to new examples, you can effectively use each medium depending on the skill being taught. Following the instructional design process will help you determine the best media mix.
- For psychomotor skills such as those requiring muscular actions, you should use real equipment although, for practical reasons such as cost and safety, you may need to create a simulation that incorporates a variety of media. Video with audio or text support can be superb for teaching psychomotor skills. Similarly, a series of images with text can also be very effective.
- Although you can use video and audio to effectively teach attitudes, for example, choosing to say "no" to drugs, your complete instructional strategy should consider other methods such as role-playing. Remember to consider learner characteristics when selecting instructional media.

5.4.5 Summary

In general, it is tempting always to look for the simplest medium first then only opt for a more complex or richer medium if the simple medium can't deliver the learning goals as adequately. However, consideration needs to be given to media richness as a criterion when making choices about media or technology, because rich media may enable learning goals to be achieved that would be difficult with a simple medium.

5.4.6 Check Your Progress

1. How important do you think the richness of the medium is when making decisions about the use of media and technology in an online course?

Response – Refer point 5.4. 4

5.5 Let Us Sum Up

- Instructional design is also considered a systematic approach to education that prompts educators to familiarize themselves with the learners in their classroom on a personal level, in order to more comprehensively understand how they learn. Once educators have gathered the intel about their students, this information is critical to designing personalized lesson plans.
- The ADDIE instructional design model provides a step-by-step process that helps training specialists plan and create training programs. The ADDIE design model revolves around the following five components:
 - ✤ Analysis,
 - Design,
 - Development,
 - Implementation and
 - Evaluation
- Gagne's Nine Events of Instruction
 - 1. Gain attention of the students.
 - 2. Inform students of the objectives.
 - 3. Stimulate recall of prior learning.
 - 4. Present the content.
 - 5. Provide learning guidance.
 - 6. Elicit performance (practice)
 - 7. Provide feedback.
 - 8. Assess performance.
 - 9. Enhance retention and transfer
- The different media categories that maybe used by in Instructional Design is as follows:
 - Text
 - Audio
 - Visuals
 - Video
 - Animations
 - Real objects

5.6 Unit End Exercise

- Q. 1 Prepare an Instructional design with the help of Gagne's Nine Events of Instruction of any subject/topic.
- Q.2 How as a teacher are you going to use various types of media in the teaching learning process? Explain with suitable examples.

5.7 References

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6

ONLINE RESOURCES AND ETHICAL PRACTICES IN ICT ENABLED TEACHING-LEARNING PROCESS

Unit Structure

- 6.0 Objectives
- 6.1 Online Resources
 - 6.1.1 Web 2.0 tools
 - 6.1.2 Open Educational Resources
 - 6.1.2.1 Principles of Open Educational Resources
 - 6.1.3 Digital Evaluation Tools
- 6.2 E -learning Portals & Database6.2.1 e- Pathshala6.2.2 SWAYAM6.2.3 N-List
- 6.3 Ethical Practices in ICT Enabled Learning Process
 6.3.1 Copyright
 6.3.2 Plagiarism
 6.3.3 Creative Commons
- 6.3.2 Plagiarism
- 6.3.3 Creative Commons
- 6.4 Let Us Sum Up
- 6.5 Unit End Exercise
- 6.6 References

6.0 Objectives

Technology has made it possible to provide a diverse range of learning resources and interactions to enhance student learning in both distance and campus contexts.

In this unit, learner will be able to

- Examine, Review and Take an informed decision about utilizing various online resources to enhance the learning environment of the learners.
- Aware about the various ethical practices to be followed while integrating various resources in the ICT enabled Learning Process.

6.1 Online Resources

In general, web pages and documents on the internet provide useful information. While an online resource is typically data and educational in

nature, any support software available online can also be considered a resource. The resources that are accessible via the Internet and World Wide Web are called Online Resources.

6.1.1 Web 2.0 Tools

In order to understand Web 2.0 tools, it is essential to understand Web1.0.Web 1.0 is used to describe the first stage of the Internet. At this point, there were few content creators; most of those using the Internet were consumers. Static pages were more common than dynamic HTML, which incorporates interactive and animated websites with specific coding or language. Content in this stage came from a server's file system rather than a database management system. Users were able to sign online guest books, and HTML forms were sent via email. Examples of Internet sites that are classified as Web 1.0 are Britannica Online, personal websites, and mp3.com. In general, these websites are static and have limited functionality and flexibility.

The term Web 2.0 first came into use in 1999 as the Internet pivoted toward a system that actively engaged the user. Users were encouraged to provide content, rather than just viewing it. People were now able to publish articles and comments, and it became possible to create user accounts on different sites, therefore increasing participation. Web 2.0 also gave rise to web apps, self-publishing platforms like WordPress, as well as social media sites. Examples of Web 2.0 sites include Wikipedia, Facebook, Twitter, and web blog sites, which all transformed the way the same information was shared and delivered. The social aspect of the Internet has been particularly transformed; in general, social media allows users to engage and interact with one another by sharing thoughts, perspectives, and opinions. Users can tag, share, tweet, and like.

There are advantages and disadvantages of Web 2.0 which are mentioned as follows:

The development of technology has allowed users to share their thoughts and opinions with others, which has created new ways of organizing and connecting to other people and promoted a greater degree of collaboration.

But there are a lot of disadvantages to the Internet acting more like an open forum. Through the expansion of social media, we have seen an increase in online stalking, cyberbullying, doxing, identity theft, and other online crimes. There is also the threat of misinformation spreading among users, whether that's through open-source information sharing sites or on social media.

Like Web 1.0, Web 2.0 is another transitional phase in the evolution of the Internet. Web 3.0 is predicted to be called the Semantic Web because it will be tailored to become more intuitive to every user's needs.

Here are examples of Web 2.0 Tools that are currently being used in MPS:

1. MPS Google Drive- Share and archive documents, Collaborate, Create forms, Build spreadsheets, Post presentations, With Google

- 2. Edmodo provides teachers and students a secure place to connect and collaborate, share content and educational applications, and access homework, grades, class discussions and notifications. Its goal is to help educators harness the power of social media to customize the classroom for each and every learner.
- **3. Twitter** is a real-time information network that connects you to the latest stories, ideas, opinions and news about what you find interesting. Simply find the accounts you find most compelling and follow the conversations.
- 4. **YouTube** Founded in February 2005, **YouTube** allows billions of people to discover, watch and share originally-created videos. YouTube provides a forum for people to connect, inform, and inspire others across the globe and acts as a distribution platform for original content creators and advertisers large and small.

Riveting talks by remarkable people, free to the world. Technology, Entertainment, Design. (**TED**).

- 5. Animoto helps to turn your photos, video clips, and music into stunning video masterpieces to share with everyone. Fast, free and shockingly easy to use.
- 6. A **wiki** is a space on the Web where you can share work and ideas, pictures and links, videos and media —and anything else you can think of. Wikispaces is special because it has a visual editor and a bunch of other tools to make sharing all kinds of content as easy for students as it is for their teachers.
- 7. Kidblog is designed for K-12 teachers who want to provide each student with an individual blog. Students Publish posts and participate in academic discussions within a secure classroom blogging community. Teachers maintain complete control over student blogs and user accounts. Use Kidblog to create classroom discussions, learn digital citizenship, practicing writing skills, create an e-portfolio, reflect on learning, and formatively assess writing.
- 8. Audacity can be used to: Record live audio, convert tapes and records into digital recordings or CDs, edit OggVorbis, MP3, WAV or AIFF sound files, cut, copy, splice or mix sounds together, change the speed or pitch of a recording.
- **9. Moodle** is a Course Management System (CMS), also known as a Learning Management System (LMS) or aVirtual Learning Environment (VLE). It is a free web application that educators can use to create effective online learning sites. For students: MPS Moodle For teachers: Online PD Moodle
- **10. Tagxedo** turns words famous speeches, news articles, slogans and themes, even your love letters -- into a visually stunning word cloud, words individually sized appropriately to highlight the frequencies of occurrence within the body of text.

11. Doodle radically simplifies the process of scheduling events, whether they're board or team meetings, dinners with friends, reunions, weekend trips, or anything else.

Thus, it is seen that Web 2.0 tools are internet tools that allow the user to go beyond just receiving information through the web. The user is expected to interact and to create content with others. Social media sites such as Facebook and Twitter are the most popular examples of Web 2.0 tools. Web tools can be used to enhance teaching and collaboration among teachers and students as well as increase professional collaboration between educators.

6.1.2 Open Educational Resources

Open educational resources are somewhat different from open learning, in that they are primarily content, while open learning includes both content and educational services, such as specially designed online materials, inbuilt learner support and assessment.

Open educational resources cover a wide range of online formats, including online textbooks, video recorded lectures, YouTube clips, webbased textual materials designed for independent study, animations and simulations, digital diagrams and graphics, some MOOCs, or even assessment materials such as tests with automated answers. OER can also include PowerPoint slides or pdf files of lecture notes. To be open educational resources, though, they must be freely available for at least educational use.

Open educational resources (OER) are defined by the United Nations as any type of educational materials in the public domain or introduced with an open license. Critical to supporting open knowledge and open access, OER are learning materials supporting legal and free (a) copying, (b) usage, (c) adaptation and (d) sharing. These resources can be anything from textbooks to syllabi, lecture notes, tests, videos or animations. OER offers the opportunity to provide access, quality and cost-effectiveness in education delivery and has led to significant dialogue around policies for knowledge sharing and capacity building in the social and economic global world.

6.1.2.1 Principles Of Open Educational Resources

David Wiley is one of the pioneers of OER. He and colleagues have suggested (Hilton et al., 2010) that there are five core principles of open publishing:

- **Re-use:** The most basic level of openness. People are allowed to use all or part of the work of their own purposes (for example, download an educational video to watch later).
- **Re-distribute:** People can share the work with others (for example, send a digital article by email to a colleague).
- **Revise:** People can adapt, modify, translate, or change the work (for example, take a book written in English and turn it into a Spanish audio book).

- **Re-mix:** People can take two or more existing resources and combine them to create a new resource (for example, take audio lectures from one course and combine them with slides from another course to create a new derivative work).
- **Retain:** No digital rights management restrictions (DRM); the content is yours to keep, whether you're the author, an instructor using the material, or a student.

Users of OER though need to check with the actual license for reuse, because sometimes there are limitations. To protect your rights as an author of OER usually means publishing under a Creative Commons or other open license. You will know more about Creative Commons under 6.3.3.

6.1.3 Digital Evaluation Tools

Digital evaluation tools have revolutionized higher education the way assessments are conducted to a large number of students across colleges and universities with digitization. The evaluation of answer scripts on the screen is slowly creeping into the mainstream learning environment to bring transparency, fairness and credibility in higher education assessments.

On screen evaluation is hoping to revolutionize the way assessments are conducted and evaluated digitally and results are announced instantly.

The following are examples of some Digital Evaluation Tools that may be used by a teacher for formative as well as summative evaluation.

- 1. Moodle: The module allows tests with questions that can be typed in the module individually, be downloaded from another module available within the Moodle system or from another distance learning programme. Each test must have a title and, optionally, a description providing users within sight into the test topic and mode of its administration. It is possible to set the time limit for each test, i.e. set its start/end time. Test duration is adjusted once a participant takes the test. If Participants are allowed to take the test multiple times; the time between tests can also be defined. The test may be visible but inaccessible. In this case, participants will be able to see the test title but will be notified of the current inaccessibility. The system allows students to submit assignments, as well as their attachments. Assignments can be evaluated using a rubric that can be created within the system. When creating a rubric, it is possible to add several separate parts and levels of criteria achievement.
- 2. Google Classroom: An assignment, schoolwork or homework are published on a channel and can be assigned to a single student or to all students. Using assignment settings options, the following can be set for a test: time availability, time limit for completion, scoring and other parameters. Within the School work section, Grading and Feedback options are available.The teacher can monitor students' achievement in every virtual classroom using a grading tool.This

tool enables teachers to enter grades related to activities conducted in their virtual classroom.

- **3. Google Forms:** Google Forms is a tool used to create templates for surveys, simple tests and questionnaires. With This tool you can conduct a short survey or questionnaire among employees and students automatically receive feedback and statistics. Question Form may contain an infinite number of various question types: multiple choice questions, yes/no questions or text type questions.
- **4. OneNote:** OneNote application enables communication and collaboration in a classroom.

OneNote Class -Notebook helps teachers:

- Create working environment in the form of a workbook to be used for class projects
- Share assignments
- Get immediate feedback on students' work and activities
- Timely review students' work 🧄
- Integrate features for giving and grading assignments.
- 5. Edmodo: If teachers choose Edmodo to evaluate their students' work they can do so by using typical tests(quiz) as well as problem or project assignments. Each created test can be copied and used for several classes. Test design includes several options: setting test duration, choosing whether to present students with the results afterwards, locking the test after due time, reshuffling questions for each individual student. Each assignment can have an attachment added (text, video clip, picture, audio clip...).

Edmodo test offers six question types: true/false, multiple choice, short answer, filling in blanks, matching pairs and multiple answers. A teacher can designate a specific number of points for each question. Furthermore, if the teacher planned so in the test settings, results for all question types, except for short answer questions, can be available to students upon test completion.

In the case of "short answer questions" a student gets feedback only after the teacher reviews and marks correct answers. A number of points earned is then assigned. Filling-in-the-blanks questions require detailed instructions on the use of letter case (small/capital/first letter...) because typing in a wrong (case) letter classifies as a wrong answer. Edmodo enables tracking a student's progress. Teacher can see every test student accessed and the score achieved. By choosing a test, one can review how each assignment was solved. Edmodo also offers statistics data on each individual test for each individual class.

6. Socrative: With a free user account you can start a public quiz room with a maximum capacity of 50 students. Types of assignments include multiple choice and true/false questions which are automatically created and where feedback is provided, and open end

questions which require typing in a response. Result report can be downloaded on a computer, e-mail or Google Disk. Report can be downloaded at class level in Excel, at student level in PDF or at question level in PDF. Student responses can be seen in real time.

- 7. Testmoz: A teacher can enter four question types in a quiz: true/false, multiple choice questions with one correct answer, multiple choice questions with several correct answers and fill-in-the blank(s) questions. Questions may have audio and video clips integrated. In the free version thetest can have up to 50 questions. In Testmoz you can create an access password that students need to type in when accessing the quiz, you can turn on question randomization and result(s) display, mark correct and incorrect answers, as well as show correct answers on quiz completion. Setting score points for each question is optional. Answers can be displayed randomly.
- 8. Flipgrid: Flipgrid is a video discussion tool. Teachers create discussion grids and students respond via video. Students can give feedback to each other. Apart from evaluation and learning, Flipgrid can be used for learning evaluation. It has an evaluation section that helps teachers evaluate student responses in a video.
- Wizer: Wizer is a tool for designing digital worksheet(s) that can 9. contain various question types: fill-in the-blanks questions, finding connections, multiple choice questions, open-ended questions, discussion type questions, tasks that entail recording answers in video or audio clips, and tasks that include drawing and marking pictures. A teacher can record the question as a video or audio clip, which makes this tool suitable for learning process adaptation. Worksheets can contain more different question types. A teacher creates classes joined by students after their registration. Free version allows creating up to two classes. Worksheets can be shared to students within the class and via e-mail or PIN. A teacher can monitor submitted worksheets and student results are recorded in a report easily downloaded onto a computer. Tasks can be customized to include automatic feedback, e.g. multiple choice questions or questions requiring making connections, while in the case of open ended questions, teachers write or record their feedback.
- 10. Class Marker: Digital online testing tool providing students with immediate feedback, and teachers with the possibility to monitor student progress and receive statistics after each test. It offers several question types: multiple choice, true/false, matching questions and short answer questions. Questions can be supported by attachments, text, picture, video or audio clips.A test can consist of strictly defined questions (tasks). A question pool can be compiled, thus providing students with randomly chosen questions from such a pool, or there can be a combination of strictly defined and randomly chosen questions from the pool. Tests can have questions re-shuffled for each student and, since questions appear to students one after the

Online Resources and Ethical Practices in ICT Enabled Teaching-Learning Process other, chances of cheating are minimized. The tool is free of charge for up to 100 tests a month, i.e. 1200 tests a year.

- 11. Quizizz: A digital quiz tool that allows single and multiple choice questions, and for each questions a different time limit is given for response. Also, it is possible to limit the time available to students to solve quizzes. Upon students' completion of the task, teachers have available detailed class-, student- and question- level statistics, in Excel. Teachers can build their own quizzes, share them with others, use other editors' quizzes or just take several questions from another quiz. Inserting pictures and mathematical expressions is allowed, but in case of complex expressions it is advisable to use images of those expressions used in some other programme.
- 12. Book-widgets: Book-widgets is a tool for creative and interactive teaching. It offers a number of options for creating teaching materials some of which, like various types of quizzes with several question types and education games, can be used for evaluation purposes. Student activities can be monitored in real time (live widgets) enabling teachers to identify students in need of their assistance. Teachers can choose among 40 different exercise templates and adapt them to their content(worksheet, shared worksheet questions in combination with text visible on a worksheet's other half, exit slips, quiz, crossword...). When creating a test, teachers can choose between 15 different question types.

Learning evaluation (exam mode) includes:

- Reports on the time a student took to respond, including answers,
- Countdown of the time a student has to complete the exercise,
- Locking the test when student completes the exercise, allowing for submitting the exercise,
 - Locking the test until the results have been sent successfully.

The tool allows creating groups to which a teacher adds students, as well as a direct link to Google Classroom, Moodle and other learning management systems.

13. Wordwall: Wordwall is an interactive digital tool with 18 template types (interactive activities) in free version, and 48 in its paid version. It is used for exercise purposes, collaboration and monitoring student progress. It can be used from preschool to secondary school. When designing a task it is possible to determine the time limit for its completion, to allow students to type in a name prior to starting the task, and to display answers and ranking. The task is shared with students via link.

6.2 E -Learning Portals & Database

The education portal is a uniquely planned site that gives a large group of educational information, administrations, and content. The term portal was

generally used to depict a port or area of numerous stacking and off loading exercises. It is currently utilized most broadly to portray a multiwork website that incorporates public and private, information recovery and entries devices, customized content, and regular connections or associations with instruction-related frameworks or administrations.

The education portal is a one-stop-shop and brings effortlessness to the table. From information about the syllabus to exam dates to admission, all the major information can be accessed through the portal. All the states in India have a dedicated education portal that has all the details like education ministers, the recent updates, notifications, changes, and likewise. They also appreciate the performance, give information about upcoming events, etc. The results of various examinations are also announced via education portals. Students, as well as teachers, can review the curriculum and more educational services.

Public portals also give out information like the schools and other educational institutions in the area and if it is an institution's education portal, students can enter the allotted key or credentials and access their details such as results, progress reports, and the like. Teachers can log attendance, upload lesson plans, study materials, and more

6.2.1 E- Pathshala

e-Pathshala is a portal/app developed by the CIET, and NCERT. It was initiated jointly by the Ministry of Human Resource Development, CIET, and NCERT, and launched in November 2015. It hosts educational resources for teachers, students, parents, researchers and educators, can be accessed on the Web, and is available on Google Play, App Store and Windows. The content is available in English, Hindi and Urdu.

The platform offers a slew of educational resources, including NCERT textbooks for classes 1-12, audio-visual resources by NCERT, periodicals, supplements, teacher training modules and a variety of other print and non-print materials. These materials can be downloaded by the user for offline use with no limits on downloads. The app supports flip book format to provide a more realistic experience.

The digital India campaign has promoted extensive use of ICTs in the teaching learning process. The e-Pathshala, a joint initiative of Ministry of Education, Govt. of India and National Council of Educational Research and Training (NCERT), has been developed for showcasing and disseminating all educational e-resources including textbooks, audio, video, periodicals, and a variety of other print and non-print materials for Students, Teachers, Parents, researchers and educators.

It provides access to digital textbooks for all classes, graded learning materials and enables participation in exhibitions, contests, festivals, workshops, etc.

Students, Teachers, Educators and Parents can access e-Books through multiple technology platforms that are mobile phones and tablets (as epub) and from the web through laptops and desktops (as Flipbook). e-Pathshala also allows users to carry as many books as their device supports. Features of these books allow users to pinch, select, zoom, bookmark, highlight, Online Resources and Ethical Practices in ICT Enabled Teaching-Learning Process navigate, share and make notes digitally. The various stakeholders can take the benefit of e-pathshala in the following way:

Students

- It provides access to the following
- Access digital textbooks (e-textbooks) for all classes
- Access graded learning materials (Supplementary books)
- Know about events
- Access e-resources (audios, videos, interactive, images, maps, question banks, etc.)

Teachers

- Access digital textbooks (e-textbooks) for all classes
- Access teaching instructions and source books
- Help children achieve expected learning outcomes
- Access and contribute to periodicals & journals
- Access Policy Documents, Reports of Committees, NCFs, Syllabus and other resources to support children learning
- Access audios, videos, interactive, images, maps, question banks, etc.

Educators

- Access digital textbooks (e-textbooks) for all classes
- Access and contribute to periodicals & journals
- Access Policy Documents, Reports of Committees, NCFs, Syllabus and other resources to support children learning
- Access audios, videos, interactive, images, maps, question banks, etc.

Parents

- Access digital textbooks (e-textbooks) for all classes
- Help children achieve expected learning outcomes
- Access Policy Documents, Reports of Committees, NCFs, Syllabus and other resources to support children learning
- Access audios, videos, interactive, images, maps, question banks, etc.

6.2.2 SWAYAM

SWAYAM is a programme initiated by the Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

Online Resources and Ethical Practices in ICT Enabled Teaching-Learning Process

This is done through a platform that facilitates hosting of all the courses, taught in classrooms from Class 9 till post-graduation to be accessed by anyone, anywhere at any time. All the courses are interactive, prepared by the best teachers in the country and are available, free of cost to any learner. More than 1,000 specially chosen faculty and teachers from across the country have participated in preparing these courses.

The courses hosted on SWAYAM are in 4 quadrants -(1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts. Steps have been taken to enrich the learning experience by using audio-video and multimedia and state of the art pedagogy / technology.

In order to ensure that best quality content is produced and delivered, Nine National Coordinators have been appointed. They are:

- AICTE (All India Council for Technical Education) for self-paced and international courses
- NPTEL (National Programme on Technology Enhanced Learning) for Engineering
- UGC (University Grants Commission) for non-technical postgraduation education
- CEC (Consortium for Educational Communication) for undergraduate education
- NCERT (National Council of Educational Research and Training) for school education
- NIOS (National Institute of Open Schooling) for school education
- IGNOU (Indira Gandhi National Open University) for out-of-school students
- IIMB (Indian Institute of Management, Bangalore) for management studies
- NITTTR (National Institute of Technical Teachers Training and Research) for Teacher Training programme

Courses delivered through SWAYAM are available free of cost to the learners, however learners wanting a SWAYAM certificate should register for the final proctored exams that come at a fee and attend in-person at designated centers on specified dates. Eligibility for the certificate will be announced on the course page and learners will get certificates only if this criterion is matched. Universities/colleges approving credit transfer for these courses can use the marks/certificate obtained in these courses for the same.

UGC has already issued the UGC (Credit Framework for online learning courses through SWAYAM) Regulation 2016 advising the Universities to identify courses where credits can be transferred on to the academic record

of the students for courses done on SWAYAM. AICTE has also put out gazette notification in 2016 and subsequently for adoption of these courses for credit transfer.

The current SWAYAM platform is developed by the Ministry of Education and NPTEL, IIT Madras with the help of Google Inc. and Persistent Systems Ltd.

6.2.3 N-List

N-LIST stands for "National Library and Information services Infrastructure for Scholarly Content". The programme was funded by the MHRD under NME-ICT to extend access to selected e-resources to colleges covered under Section 12B of UGC Act as well as Non-aided colleges during from 2010 - 2013. The programme has subsumed under e-ShodhSindhu Consortium as a college component from 2014 being funded by UGC.

The following section provides a brief background about the project-

The Project entitled "National Library and Information Services Infrastructure for Scholarly Content (N-LIST)", being jointly executed by the e-ShodhSindhu Consortium, INFLIBNET Center and the INDEST-AICTE Consortium, IIT Delhi provides for,

- i) cross-subscription to e-resources subscribed by the two Consortia, i.e. subscription to INDEST-AICTE resources for universities and e-ShodhSindhu resources for technical institutions; and
- ii) access to selected e-resources to colleges. The N-LIST project provides access to e-resources to students, researchers and faculty from colleges and other beneficiary institutions through server(s) installed at the INFLIBNET Center. The authorized users from colleges can now access e-resources and download articles required by them directly from the publisher's website once they are duly authenticated as authorized users through servers deployed at the INFLIBNET Center.

N-LIST comprises of Four Components-

- i) to subscribe and provide access to selected e-ShodhSindhu eresources to technical institutions (IITs, IISc, IISERs and NITs) and monitor its usage;
- ii) to subscribe and provide access to selected INDEST e-resources to selected universities and monitor its usage;
- iii) to subscribe and provide access of selected e-resources to Govt./ Govt.-aided colleges and monitor its usage; and
- iv) to act as a Monitoring Agency for colleges and evaluate, promote, impart training and monitor all activities involved in the process of providing effective and efficient access to e-resources to colleges.

The INDEST and UGC-INFONET are jointly responsible for activity listed at i) and ii) above. The INFLIBNET Center, Gandhinagar is responsible for activities listed at iii) and iv) above.

The INFLIBNET Center is also responsible for developing and deploying appropriate software tools and techniques for authenticating authorized users.

Online Resources and Ethical Practices in ICT Enabled Teaching-Learning Process

Colleges covered under 12B Section of UGC Act are benefitted by N-List. These colleges will get access to selected electronic resources including ejournals and e-books. However, non-aided colleges (except Agriculture, Engineering, Medical, Pharmacy and Nursing) may join N-LIST programme with applicable annual membership Fee.

The N-LIST covers all the disciplines viz. Pure Sciences, Social Sciences and Humanities including Linguistic and Languages. However, e-resources in engineering, agriculture and medicine are not covered under the N-LIST programme.

6.3 Ethical Practices In Ict Enabled Learning Process

As we increase the use of technology in the classroom, we must also be conscious of ethical issues that arise from that technology use. Understanding the biggest ethical issues affecting our classrooms will help us better understand how to address them. The widespread availability of technology brings new and challenging ethical issues to the forefront. In the forthcoming section we will try to familiarize with some such considerations.

6.3.1 Copyright

Copyright is a type of intellectual property that protects original works of authorship as soon as an author fixes the work in a tangible form of expression. In copyright law, there are a lot of different types of works, including paintings, photographs, illustrations, musical compositions, sound recordings, computer programs, books, poems, blog posts, movies, architectural works, plays, and so much more!

Works are original when they are independently created by a human author and have a minimal degree of creativity. Independent creation simply means that you create it yourself, without copying. There are some things, however, that are not creative, like: titles, names, short phrases, and slogans; familiar symbols or designs; mere variations of typographic ornamentation, lettering, or coloring; and mere listings of ingredients or contents. And always keep in mind that copyright protects expression, and never ideas, procedures, methods, systems, processes, concepts, principles, or discoveries.

A work is fixed when it is captured (either by or under the authority of an author) in a sufficiently permanent medium such that the work can be perceived, reproduced, or communicated for more than a short time. For example, a work is fixed when you write it down or record it.

Everyone is a copyright owner. Once you create an original work and fix it, like taking a photograph, writing a poem or blog, or recording a new song, you are the author and the owner. Companies, organizations, and other people besides the work's creator can also be copyright owners. Copyright law allows ownership through "works made for hire," which establishes that works created by an employee within the scope of employment are owned by the employer. The work made for hire doctrine also applies to certain independent contractor relationships, for certain types of commissioned works.

Copyright ownership can also come from contracts like assignments or from other types of transfers like wills and bequests.

Granting copyright seeks to protect the creative endeavor of an owner. Copyright gives an exclusive right to the owner to do certain acts in relation to literary, dramatic, musical, and artistic works, cinematography and sound recordings. Copyright is valid till the life of the originator plus 50 years after his death. In the case of cinematographic work, the copyright is valid until 50 years after the work has been made available to the public while for photographic works 25 years after the making of the work.

In India matters related to copyright are governed by the Copyright Act in 1957, which was subsequently amended in the year 1994 and 2002. Copyright cannot be granted in some cases like:

- Copyright cannot be said to be violated if the idea or concept of any person is used in a different manner.
- Copyright is not granted for ideas.
- Copyright is not granted in live events.

So, basically for granting the copyright, the work which is being sought to be protected by copyright must be original. However, this standard of originality to be determined varies in countries. In countries which follow common law jurisdictions like United Kingdom and India, the standard of originality that is needed to be proven is low, while in countries which follow civil law jurisdictions like France and Germany, the standard of originality to be proven is high as certain minimum amount of creativity and author's intellectual expression is required to be shown to acquire a copyright protection.

Indian perspective on copyright protection:

The Copyright Act, 1957 provides copyright protection in India. It confers copyright protection in the following two forms:

(A) Economic rights of the author, and

(B) Moral Rights of the author.

The following are Rights of the copyright owner-

1. **Right of Reproduction-** This is the most prominent right which is acquired after copyright protection. This right authorizes the person having such copyright to make copies of the protected work in any form. In the modern context copying, a song on a Compact Device or any sound and visual recording can be considered as a reproduction of the content. Prior to copying the permission of the author is required unless it can be shown that such copying is not intended to make any commercial benefits out of it.

- 2. **Right to Distribute-** Right to distribute is an off-shoot of the right of reproduction. The person who owns the copyright may distribute his work in any manner he deems fit. The owner is also entitled to transfer the whole or some rights in favor of any other person while retaining others. For example, he can entitle any person to translate his work.
- 3. Right to make Derivative Works- The copyright has the right to use his work in various ways, for instance making adaptations or translations. One example of adaptation is making a movie based on a novel, so here to make any derivative work the consent of the owner is mandatorily required. In these situations, certain other rights of the owner also come into play, like the right to integrity which protects the owner against deformation, defacement or modification of his work in a way that is harmful for his reputation.
- 4. **Right to Publicly Perform-** The owner of the copyright has the right to publicly perform his works. Example, he may perform dramas based on his work or may perform at concerts, etc. This also includes the right of the owner to broadcast his work. This includes the right of the owner to make his work accessible to the public on the internet. This empowers the owner to decide the terms and conditions to access his work.
- 5. Right to Follow- This right is granted generally only to the authors and artists. This empowers the authors to obtain a percentage of the subsequent sales of his work and is called Droit de Suite or Right to Follow. The right is also available to artists on resale of their work.
- 6. **Right of Paternity-** The Right of Paternity or Attribution gives the copyright owner a right to claim authorship of the work. Under the Right of Paternity, a copyright owner can claim due credit for any of his works. Thus, if a movie is produced based on a book by an author, and he hasn't been given due credit in it, he can sue the makers to acknowledge his work.
- 7. Sui Generis Rights- The ordinary copyright law often fails to protect the computer software and databases since the essential element of creativity is not present in such databases. Therefore, there was a need for new laws to protect such software and databases. The law of sui generis was introduced to resolve the problem of resolving databases on the whole. A database is a compilation or arrangement of information which may not be creative; it may still require protection from unauthorized copying. However, this may require certain modifications such as the making of copies has to be excluded from such copyright protection. Such database rights exist for a fifteen year period.
- 8. **Private Copying-** This is an exception to the reproduction rights which are attained by the owner. According to this right, any person can make copies of the copyrighted work if it is proved that such copying is for educational purposes and that there is no commercial motive behind such copies being made.

In conclusion it may be said that copyright law adequately protects the rights of the copyright owners. The law has kept pace with the changing times and has accommodated a number of new things in its ambit, including digital reproduction and sui generis rights. India has also risen up to the challenge and updated its copyright law from time to time.

6.3.2 Plagiarism

Plagiarism is presenting someone else's work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition. Plagiarism may be intentional or reckless, or unintentional. Under the regulations for examinations, intentional or reckless plagiarism is a disciplinary offense.

Plagiarism can be in different forms-

- 1. Verbatim (word for word) quotation without clear acknowledgement- Quotations must always be identified as such by the use of either quotation marks or indentation, and with full referencing of the sources cited. It must always be apparent to the reader which parts are your own independent works and where you have drawn on someone else's ideas and language.
- 2. Cutting and pasting from the Internet without clear acknowledgement- Information derived from the Internet must be adequately referenced and included in the bibliography. It is important to evaluate carefully all material found on the Internet, as it is less likely to have been through the same process of scholarly peer review as published sources.
- **3. Paraphrasing-** Paraphrasing the work of others by altering a few words and changing their order, or by closely following the structure of their argument, is plagiarism if you do not give due acknowledgement to the author whose work you are using.

A passing reference to the original author in your own text may not be enough; you must ensure that you do not create the misleading impression that the paraphrased wording or the sequence of ideas are entirely your own. It is better to write a brief summary of the author's overall argument in your own words, indicating that you are doing so, than to paraphrase particular sections of his or her writing. This will ensure you have a genuine grasp of the argument and will avoid the difficulty of paraphrasing without plagiarizing. You must also properly attribute all material you derive from lectures.

5. Collusion- This can involve unauthorized collaboration between students, failure to attribute assistance received, or failure to precisely follow regulations on group work projects. It is your responsibility to ensure that you are entirely clear about the extent of collaboration permitted, and which parts of the work must be your own.

- 6. Inaccurate citation- It is important to cite correctly, according to the conventions of your discipline. As well as listing your sources (i.e., in a bibliography), you must indicate, using a footnote or an intext reference, where a quoted passage comes from. Additionally, you should not include anything in your references or bibliography that you have not actually consulted. If you cannot gain access to a primary source, you must make it clear in your citation that your knowledge of the work has been derived from a secondary text (for example, Bradshaw, D. Title of Book, discussed in Wilson, E., Title of Book (London, 2004), p. 189).
- 7. Failure to acknowledge assistance- You must clearly acknowledge all assistance which has contributed to the production of your work, such as advice from fellow students, laboratory technicians, and other external sources. This need not apply to the assistance provided by your tutor or supervisor, or to ordinary proofreading, but it is necessary to acknowledge other guidance which leads to substantive changes of content or approach.
- 8. Auto-plagiarism- You must not submit work for assessment that you have already submitted (partially or in full), either for your current course or for another qualification of this, or any other, university, unless this is specifically provided for in the special regulations for your course. Where earlier work by you is citable, i.e. it has already been published; you must reference it clearly. Identical pieces of work submitted concurrently will also be considered to be auto-plagiarism.

Summing up, it must be understood that Plagiarism is a breach of academic integrity. It is a principle of intellectual honesty that all members of the academic community should acknowledge their debt to the originators of the ideas, words, and data which form the basis for their own work. Passing off another's work as your own is not only poor scholarship, but also means that you have failed to complete the learning process. Plagiarism is unethical and can have serious consequences for your future career; it also undermines the standards of your institution and of the degrees it issues

6.3.3 Creative Commons (CC)

Creative Commons an internationally active non-profit organization that provides free licenses for creators 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 advance under certain conditions. Every time a work is created, such as when a journal article is written or a photograph taken, that work is automatically protected by copyright. Copyright protection prevents others from using the work in certain ways, such as copying the work or putting the work online.

CC licenses allow 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 seek the creator's permission when they want to use the work in a way not permitted by the license.

The great thing is that all CC licenses allow works to be used for educational purposes. As a result, teachers and students can freely copy, share and sometimes modify and remix a CC work without having to seek the permission of the creator.

Creative Commons licenses are applied by the copyright owner to their own works. These are the most prominently used licenses of their type in the world. There are four components to the licenses that are arranged in six configurations:

BY - Attribution required.

NC - No commercial use.

ND - No derivative works.

SA - Share Alike - the license must be the same on any derivative works.

The ND and SA components cannot be combined, as SA only applies to derivative works.

The six licenses (excluding CC-0 which is an equivalent to the Public Domain) are:

CC-BY

CC-BY-SA

CC-BY-ND

CC-BY-NC

CC-BY-NC-SA

CC-BY-NC-ND

There are six different license types, listed from most to least permissive here:



CC BY - This license allows re users to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use.

CC BY includes the following elements:

BY – Credit must be given to the creator


CC BY-SA - This license allows re users to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use. If you remix, adapt, or build upon the material, you must license the modified material under identical terms.

CC BY-SA includes the following elements:

BY - Credit must be given to the creator

SA – Adaptations must be shared under the same terms



This license allows re users to distribute, remix, adapt, and build upon the material in any medium or format for non-commercial purposes only and only so long as attribution is given to the creator.

It includes the following elements:

BY - Credit must be given to the creator

NC - Only non-commercial uses of the work are permitted



This license allows re users to distribute, remix, adapt, and build upon the material in any medium or format for non-commercial purposes only and only so long as attribution is given to the creator. If you remix, adapt, or build upon the material, you must license the modified material under identical terms.

CC BY-NC-SA includes the following elements:

BY - Credit must be given to the creator

NC - Only non-commercial uses of the work are permitted

SA – Adaptations must be shared under the same terms



This license allows re users to copy and distribute the material in any medium or format in un adapted form only and only so long as attribution is given to the creator. The license allows for commercial use.

CC BY-ND includes the following elements:

BY - Credit must be given to the creator

ND – No derivatives or adaptations of the work are permitted



This license allows re users to copy and distribute the material in any medium or format in un adapted form only, for non-commercial purposes only, and only so long as attribution is given to the creator.

CC BY-NC-ND includes the following elements:

BY – Credit must be given to the creator

NC - Only non-commercial uses of the work are permitted

ND - No derivatives or adaptations of the work are permitted

The Creative Commons Public Domain Dedication



CC0 (aka CC Zero) is a public dedication tool, which allows creators to give up their copyright and put their works into the worldwide public domain. CC0 allows re users to distribute, remix, adapt, and build upon the material in any medium or format, with no conditions.

To sum up, it must be understood that the six licenses and the public domain dedication tool give creators a range of options. The best way to decide which is appropriate for you is to think about why you want to share your work, and how you hope others will use that work.

Before you apply a CC license or CC0 to your work, there are some important things to consider:

- The licenses and CC0 cannot be revoked. This means once you apply a CC license to your material, anyone who receives it may rely on that license for as long as the material is protected by copyright, even if you later stop distributing it.
- You must own or control copyright in the work. Only the copyright holder or someone with express permission from the copyright holder can apply a CC license or CC0 to a copyrighted work. If you created a work in the scope of your job, you may not be the holder of the copyright.

6.4 Let Us Sum Up

- The resources that are accessible via the Internet and World Wide Web are called Online Resources.
- The term Web 2.0 actively engaged the user. Users were encouraged to provide content, rather than just viewing it.
- Open educational resources (OER) are defined by the United Nations as any type of educational materials in the public domain or introduced with an open license. Critical to supporting open knowledge and open access, OER are learning materials supporting legal and free (a) copying, (b) usage, (c) adaptation and (d) sharing.
- Digital evaluation tools have revolutionized the way assessments are conducted and evaluated digitally and results are announced instantly.
- E -learning Portals & Database are uniquely planned sites that give a large group of educational information, administrations, and content.
- The e Pathshala, a joint initiative of Ministry of Education, Govt. of India and National Council of Educational Research and Training (NCERT), has been developed for showcasing and disseminating all educational e-resources including textbooks, audio, video, periodicals, and a variety of other print and non-print materials for Students, Teachers, Parents, researchers and educators.
- SWAYAM is a programme initiated by the Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.
- N-LIST stands for "National Library and Information services Infrastructure for Scholarly Content". The programme was funded by the MHRD under NME-ICT to extend access to selected eresources to colleges covered under Section 12B of UGC Act as well as Non-aided colleges during from 2010 - 2013. The programme has subsumed under e-ShodhSindhu Consortium as a college component from 2014 being funded by UGC.
- Copyright is a type of intellectual property that protects original works of authorship as soon as an author fixes the work in a tangible form of expression.
- Plagiarism is presenting someone else's work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgement

ICT In Education

• Creative Commons an internationally active non-profit organization that provides free licenses for creators 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 advance under certain conditions

6.5 Unit End Exercise

- 1. Give some examples of Web 2.0 tools.
- 2. Enumerate the principles of OER.
- 3. Describe some examples of Digital Evaluation Tools.
- 4. Describe the significance of e-Pathshala to different stakeholders.
- 5. Describe the project N-List.
- 6. What is Plagiarism?
- 7. Explain the different license options available under Creative Commons.

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