

Block

2

**TEACHING AT A DISTANCE: DESIGN AND
DEVELOPMENT OF ODE RESOURCES**

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BESE-131: Open and Distance Education

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BLOCK 2 TEACHING AT A DISTANCE: DESIGN AND DEVELOPMENT OF ODE RESOURCES

Introduction to the Block

In Block 1, we have presented to you the genesis and evolution of open and distance education in terms of its concept, scope, need, features, organization as well as its historical developments, theoretical foundations, and practice at national and global levels. You are thus aware that ODE involves both teaching and learning at a distance, and a provision for support services to students to enhance their learning is very essential.

In this Block (i.e. Block 2), we discuss different aspects of teaching at a distance with emphasis on design and development of ODE resources. It contains four Units.

Unit-5, Designing Self-Learning Materials, focuses on instructional design models including universal design, implications of learning and communication theories for distance education in general and for Self-Learning Materials (SLMs) in particular, and the key considerations in designing SLPMs.

Unit-6, Media and Technology for ODE, highlights the taxonomies of media, applications of media and technology for ODE, merits and demerits of various media including educational media, pedagogical utility of different media, generational models of distance education, and the growing significance of technology-enhanced learning such as OER, MOOCs and M-Learning in the context of ODE.

Unit-7, Development of Self-Learning Print Materials, deals with the concept, need, components and characteristics of Self-Learning Print Materials (SLMs), the prerequisites for course writers / instructional designers, and the process of preparation and development of SLPMs including editing of an SLM Unit.

Unit-8, Development of eLearning Resources, explains the concept of e-learning along with its pedagogy and design process, describes different types of eLearning resources (digital print, digital audio, digital video, and web-based), presents an overview of various types of digital content creation tools, discusses the systems for delivering eLearning (Learning Management Systems, and Learning-Content Management Systems) and highlights growing significance of eLearning through various Web 2.0 tools (Blogs, Wiki, Social networking, Social bookmarking, Micro-blogging).

After having worked through this Block, you will be able to:

- identify and apply the required media, technology, methods, tools, materials and other resources including human resources for distance teaching-learning and generating ODE resources;
- design and develop open and distance education programmes based on SLMs/SLPMs for the identified target groups; and
- develop e-learning resources for promoting more open, flexible and ubiquitous learning.

The format and the presentation of units in this Block are similar to that of Block 1. Therefore, if you revisit the schematic representation of a unit, and other details given under 'Introduction to Block 1' it would help you have a better access to the contents of this Block.

UNIT 5 DESIGNING SELF-LEARNING MATERIALS

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5.0 INTRODUCTION

The success of open and distance education system depends mainly on the quality and effectiveness and of its teaching-learning materials in print and non-print media. Distance teaching-learning materials are popularly called self-instructional materials (SIMs) or self-learning materials (SLMs).

As we know the concepts of learning and communication are interrelated. With effective communication the probability of learning at a distance can be enhanced and also distance learner can be enabled to exercise his autonomy in learning and overcome the barriers of distance and time. An understanding of the factors involved in human learning and communication can guide the distance educator in designing and developing effective SIMs/SLMs.

In this Unit, we therefore make an attempt to enable you to learn about how the learning and communication theories are helpful in the practice of distance education in general, and in designing self-learning materials (SLMs) or self-learning print materials (SLPMs) in particular.

5.1 OBJECTIVES

After thorough reading of this unit, you should be able to:

- discuss different instructional strategies followed in open and distance education;
- explain instructional design process and models related to designing of SLMs in distance education;
- relate the theories of learning and communication to the practice of distance education;
- analyse the implications of different theories of learning for designing SLMs; and
- appreciate the principles, features and process of designing SLPMs.

5.2 INSTRUCTIONAL STRATEGIES

SIMs or SLMs are inevitable means of delivery of open and distance education. Moreover, when print medium forms major medium of instruction, it gets supplemented and complemented by other media. These media of instruction together encompass the entire gamut of instructional strategies. The instructional strategies the distance educators use help shape learning environments and represent professional conceptions of learning and of the learner. Since distance education is more learner-centric in its nature, instructional strategies need to encourage active role of the distance learner in the learning process. Hence, teaching and learning at a distance needs special instructional strategies to help students achieve their course and programme objectives.

There exists a range of instructional strategies adopted by open and distance education institutions. Let us discuss, in brief, the main strategies.

i) Text Material Strategies

Specially designed printed text forms a popular strategy in distance education. The printed texts are developed on the basis of the principles of designing the SIMs/SLMs. The students learn from these materials independently, which, of course, their learning depends upon their skills of reading / study. We shall discuss the concept, principles and process, among others, of designing of SIMs/SLMs in detail in the subsequent sections of this unit.

ii) **Broadcast Strategy**

Radio broadcasting or telecasting either by using specially developed audio or video cassettes or by direct broadcast or telecast of the programmes is another important strategy adopted by open and distance education institutions.

iii) **Mixed mode or multi-media strategy**

It involves more than one medium in development and delivery of teaching and learning material or instruction to the distance learners. Of course, a combination of instructional strategies is always more effective than one strategy.

iv) **Online Strategy**

This is the latest strategy followed by open and distance education institutions using high-tech or advanced information and communication technologies for offering education to distance students having access to the same individually, or as a group, either at their homes or at designated places of the institution.

v) **Supplementary and complementary strategy**

In addition to the above strategies, there is often need to supplement and/or complement the offer of programmes/courses by engaging the distance students in using different activities such as project work, face-to-face contact, peer group discussions, audio-visual materials, teleconference, etc:

- **Project Work:** Broadly, the objective of the project work is to develop abilities and skills in students by applying the knowledge gained through (studying) the units. The project work helps the students link their knowledge with the real life situations and apply their knowledge to solve the problems.
- **Face-to-Face or Personal Contact Programmes:** These programmes are organized to answer queries of students and to enable them achieve higher level objectives, including acquiring psychomotor skills. These programmes can be organized in different ways keeping in view the relevant objectives. Seminars, workshops, counselling sessions, laboratory work, residential schools, etc., can be the face-to-face programmes primarily meant for group interaction between the students and teachers, and also among students.
- **Peer Group Discussion:** Distance learners generally do not get an opportunity to interact and share their problems/ideas/experience (related to their study). Learning through peer group interactions is quite effective in distance education. In addition to the above mentioned face-to-face contact programmes, the study centers of distance education system work as contact places for peer group discussions on different occasions. Recently, the ICT has revolutionized the group formation and information sharing through e-mail and many social media, among others, serving as boon for distance learners.
- **Audio-Visual Materials:** The use of multiple media strengthens distance teaching / learning process by exploiting the potential of each

individual medium. Appropriate media are selected to supplement and complement each other or to integrate them to achieve a variety of course objectives in cognitive, affective and psychomotor domains.

- **Teleconference:** Audio conferencing through telephone technology, one-way video and two-way audio conference and two-way video conference through a combination of satellite technology with other technologies including computer conferencing are also widely used by open and distance education institutions to provide audio-visual experiences to the students.

No one instructional strategy is best in all situations and in all situations. Each instructional strategy may be best only in given situation and with particular target group of learners. The instructional strategies are decided mainly keeping in view the instructional design.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

- 1) List the instructional strategies that can be followed in open and distance education. Which of them do you think is the best and why?

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5.3 INSTRUCTIONAL DESIGN

In order to understand instructional design let us first understand the terms ‘instruction’ and ‘design’ and then ‘instructional design’ and ‘learning design’.

Instruction is defined as the combination of teaching and learning, where teaching and learning are mutually inclusive. Student performance is the focal point of instructional design and teaching is regarded as a means to facilitate and improve student performance. *Design* refers to a plan or set of artifacts produced to illustrate thought and provide guidance for constructing new knowledge. *Learning design* applies concepts, theories and practices about the construction of knowledge to day-to-day realities. *Instructional design* is commonly manifested as a coherent collection of cognitive tools that extend the capability of the teacher as well as extend intellectual and skill capacity of the student that is based on some identifiable organizing theme. (http://itfoundations.coe.uga.edu/index.php?title=Instructional_Design).

According to Merrill, et al (1996) instructional design may be thought of as a framework for developing modules or lessons that:

- increases the possibility of learning;
- makes the acquisition of knowledge and skill more efficient, effective, and appealing; and
- encourages the engagement of learners so that they learn faster and gain deeper levels of understanding.

Instructional Design is defined as “a systematic process that is employed to develop education and training programs in a consistent and reliable fashion” (Reiser and Dempsey, 2007). As we know a framework contains some components, while the process involves certain steps. The instructional design is both a framework representing a model with an integral process involved in using it.

While designing instruction, it is essential to follow certain principles. Let us discuss these principles below, before we discuss instructional design as a process and a model.

5.3.1 Principles

General principles of designing instruction cover cognitive, affective and psychomotor levels. Locatis and Atkinson (1984) have discussed these principles in detail, an overview of which is presented below.

Cognitive learning

- Introduce novel events at the start of the instruction.
- Inform learners about the expected learning outcomes. There should be some provision for learners to assess their performance.
- Recall relevant pre-requisites and base the presentation in SLMs on the pre-requisites.
- Present only relevant and essential information to help learners achieve the objectives.
- Analyse and organize content in a manner that is easy for learners to comprehend. For this, advance organizers should be used to tell learners about what they are going to learn or do.
- Follow teaching maxims, such as simple to complex, concrete to abstract, general to specific, etc.
- Provide prompt and cue to direct learners’ attention. Highlighting, underlying or superimposing words can draw attention to important learning points.
- Present relevant examples and illustrations to make the difficult and abstract concepts comprehensible. Examples should present perspectives of a concept.
- Provide appropriate practice to attain mastery learning. By doing so we can motivate learners to apply knowledge to new situations.
- Provide constructive feedback to learners at each stage of their learning, which will reinforce learning.

- Review and repeat important learning points to recapitulate what has been discussed.

Affective learning

- Take the learners into confidence and tell them that the behaviour they are going to acquire is useful and important. Also, apprise them of the significance of discussion.
- Make adequate provision for external reward on displaying expected behaviour.
- Ensure that learners experience success and accomplishment. They should successfully complete the learning tasks.
- Associate content with objects, which can capture and sustain their interest.
- Use multiple media and multimedia approach to effect learners' behaviour patterns.

Psychomotor learning

- Identify skill characteristics. Each psychomotor skill requires different teaching conditions and ways of demonstrating and practising the skill. Most skills have multiple characteristics, and hence combination of conditions for learning must be obtained.
- Demonstrate and explain the skill: Demonstration should be followed by explanation.
- Provide ample practice and feedback on performing the skill.

Above principles will you understand the instructional design process (model).

5.3.2 Process and Models

Instructional Design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. Instructional design, also known as instructional systems design, is the analysis of learning needs and systematic development of instruction. An instructional design contains a framework of components as well as detailed procedures drawn up for all the stages involved in development, delivery and improvement of instruction. Instructional design is a systematic process by which instruction is planned, developed, implemented, evaluated and revised.

Instructional design models allow people to visualize the overall process and establish guidelines for managing or practicing instructional design. Instructional design models provide a means for communicating among team members, clients and stakeholders. The instructional design process is inseparably integrated into a model. In order to provide you comprehensive understanding of the process and models of instructional design we will discuss ASSURE and ADDIE models in this sub-section, and Universal Design in sub-section 5.3.3.

A) ASSURE model

The ASSURE model is extremely learner-centered. Unlike most instructional design models, this model, introduced by Heinich, Molenda, Russell and Smaldino (1999), does not have a visual representation or diagram. It is a very logical and simple design model which incorporates Gagné's events of instruction

(Gagné, 1985) to assure effective use of media in the teaching-learning process. This model is helpful for designing learning/training materials using different kinds of technology and media. It provides procedural guide for planning, developing and delivering instruction that integrate media into the teaching-learning process. Let us discuss this model which consists of the following steps.

A = Analyze learners

S = State standards and objectives

S = Select strategies, technology, media and materials

U = Utilize technology, media and materials

R = Require learner participation

E = Evaluate and revise

- i) **Analyze learners:** You should know your learners fully well before designing learning materials for them. It is essential to understand them in terms of their characteristics, prerequisite knowledge, abilities, attitudes, skills, learning styles/preferences, interests, motivational level, etc.
- ii) **State standards and objectives:** The second step in designing instruction is the statement of objectives in terms of learning outcomes which can be tested and observed. Heinich et al (*op cit*), used the formula of ABCD (A = Audience; B = Behavior; C = Conditions; D = Degree) to create well stated objectives. Well stated objectives are based on behaviour to be demonstrated, conditions under which the behaviour will be observed and the degree/standard to which the content, skills or behaviour are to be mastered/attained. The objectives specify what the learners will be able to do at the end of the unit/course. You should therefore be realistic while stating objectives so that the learners are able to achieve them after instruction (a course/unit). You should also consider how the objectives are assessed, what techniques and tools are used, and what methods of analysis are to be applied.
- iii) **Select strategies, technology, media and materials:** In order to design self-learning materials you need to make decisions about content, technology, media, methods and materials. Different kinds of technology, methods and media are available to choose from, and their judicious selection and integration will help in effective delivery of the content to achieve the end of instruction.
- iv) **Utilize technology, media and materials:** Once appropriate methods, media and materials are selected the development process starts – writing, editing, graphic and artwork, tryout/validation, production and implementation of materials. Visualization of abstract and difficult concepts in the materials is important because there is need to focus on their clarity in the materials to increase learner motivation. The material is prepared in such a way that it creates conducive learning environment. You should remember that it is learning, not content, that should be placed at the centre stage. Use variety of technology, methods, media and materials will be more effective in this regard. Facilitating learning entails building access and validating a variety of activities, frameworks and experience for effective learning.
- v) **Require learner participation:** According to theories of learning, active participation of the learners is a pre-condition for any learning to occur.

Learners learn best when they are actively involved in the learning process. The instructional design should provide for adequate opportunities to make the learning process more participatory by encouraging interactivity, discussion, individual and group work, activities, hands-on experiences, and so on. The technology, methods and media selected should be used appropriately, more so innovatively, to encourage learners' participation — physical, cognitive and emotional — to transact content, activities, experiments, etc effectively.

- vi) ***Evaluate and revise:*** You should evaluate the entire instructional process. You should reflect upon the effectiveness of the technology, methods, media and materials. Evaluation will help you know whether the objectives, instructional strategy, teaching methods(s) and media, and the content transacted/delivered were effective enough to facilitate learning. You should re-examine the entire process if the desired results are not achieved, and necessary improvements be brought about. The assessment should be a continuous process to be carried out before, during and after implementation of instruction. Based on the feedback the instructional design should be modified or revised. Therefore, it is important to act upon the evaluation results to revise or bring in required improvement.

B) ADDIE model

The ADDIE model is a framework that lists generic processes that instructional designers and training developers use (Morrison, 2010). This is, in fact, best known and most frequently used instructional design model. ADDIE is an acronym for **Analyze, Design, Develop, Implement and Evaluate** — the five stages/phases/steps which are common to the practice of instructional design. It illustrates the conceptual components of instructional design and represents a descriptive guideline for building effective instructional design (process). The five stages/phases/steps represent a dynamic, flexible guideline for building effective teaching, learning, training and performance support tools. Each stage has an outcome that feeds the subsequent stage. Thus, the output of a previous stage works as the input for the subsequent stage, though not strictly in that sequence all through.

Analyze

During this stage you should analyze the learners' needs, characteristics, learning styles and constraints, and instructional goals. You should have clear understanding of the learner's existing knowledge and skills, objectives or desired behavioral outcomes, required resources and instructional problems. You should also identify the learning environment, methods, media, materials, etc., determine potential delivery systems/options and have an overall plan of managing them all.

Design

This stage deals with learning objectives, assessment instruments, concept map (organization of contents), exercises, activities of a course/unit, and media selection. Therefore, in this stage, you should decide the specific learning objectives, learning content, tasks, experiences, activities for different instructional strategies, methods and media, assessment techniques, etc. for preparing and developing a framework of instruction.

Develop

At this stage you should generate content, develop prototype learning materials, develop guidance for the learners, develop supporting media, conduct pilot tests, do formative revisions and prepare necessary learner support services to help learners achieve the prefixed objectives. You should ensure that the sequencing of learning experiences is appropriate to the attainment of learning objectives. The learning tasks and activities should be interactive, interesting and creative so that the learner feels motivated to explore the concepts in depth. If e-learning is involved, you should develop or integrate technologies and debug required materials and procedures to effectively guide them through the material.

Implement

During this stage learners are provided different learning experiences for effective transaction of the curricular components. You should ensure proper learning environment and engage the students effectively through appropriate technology, methods and media in tune with the objectives to be attained. You have to ensure that the content is well taken by the learners. You should also develop procedures for orienting facilitators and learners. Training facilitators should include the course curriculum, learning outcomes, method of delivery, and testing procedures. Preparation for learners includes student registration, orienting and training on activities and new tools (software or hardware), overall curriculum transaction and evaluation procedure/process.

Evaluate

During this stage you should evaluate the effectiveness of all components, including the performance of learners as well as strengths and weaknesses of methods, media and materials. You should: (a) determine evaluation criteria, select/develop evaluation tools, and conduct evaluations; (b) assess the quality of instructional products and processes, before, during and after implementation; (c) know whether the learners have acquired expected knowledge, skills, attitudes and competencies; and (d) find out the gaps/deficiencies in the entire instructional process so that necessary improvements can be brought about accordingly.

This model envisages formative assessment as an integral part of the instructional design process. Formative assessment is carried out at each stage so that quality learning materials are developed and delivered to the learners. Feedback collected through formative assessment is fed into the instructional design process. The summative evaluation provides information about the discrepancy between the expected/desired and actual learning outcomes and also about strengths and weaknesses of all the input components in the entire process of the instructional design for its improvement.

ADDIE is thus a generic model which is very flexible. Institutions and systems can suitably modify or adopt it to incorporate variety of feedback between and across these steps/phases and accordingly differently depicted and used with desired flexibility. For example, see Figures 5.1 and 5.2 which show variation in the revision and redesign of the model in the cycle of design process and/or revision cycles between the steps respectively.

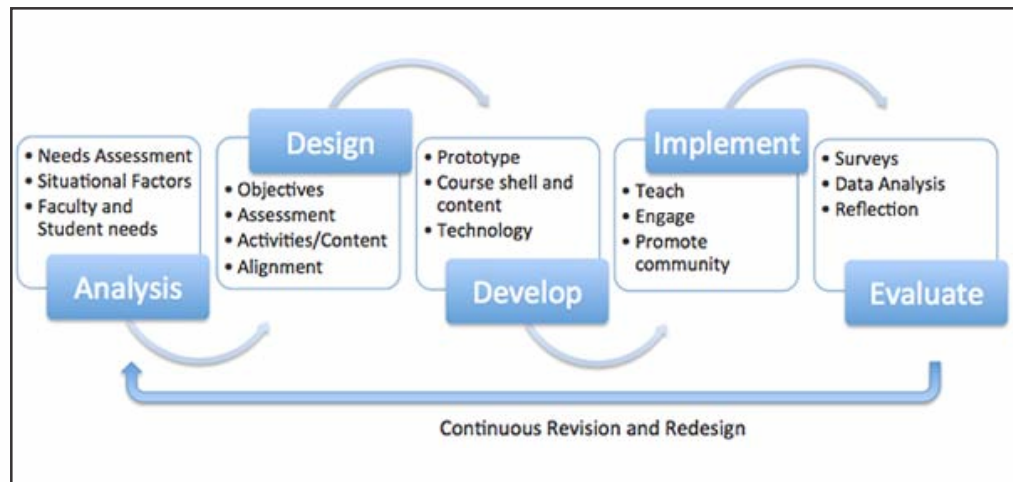


Figure 5.1: ADDIE Model

Source: http://ecampus.uconn.edu/course_development/addie.html

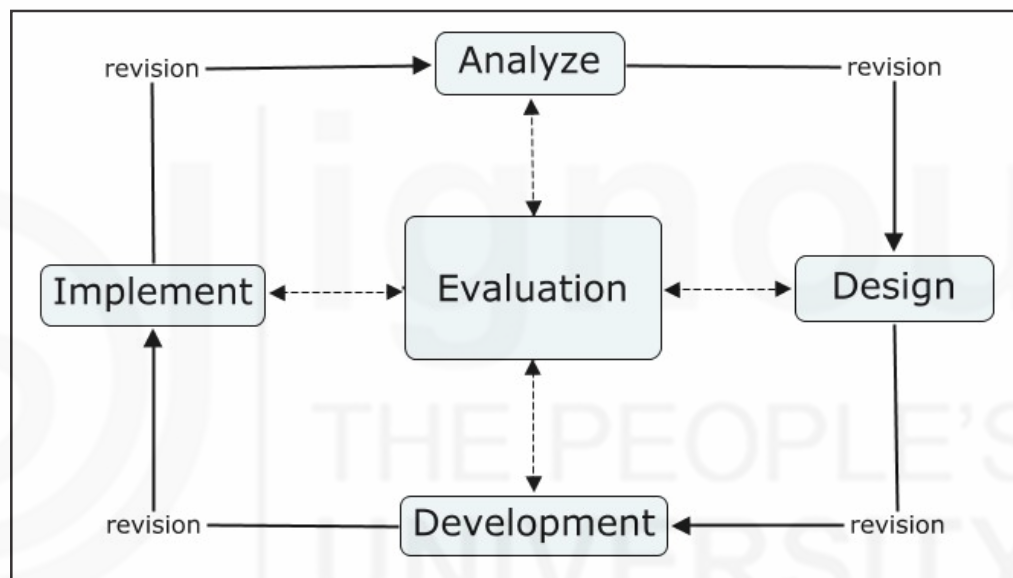


Figure 5.2: ADDIE Model

Source: https://en.wikipedia.org/wiki/ADDIE_Model

Many such variants are followed using ADDIE model for it represents a generic framework of the process of instructional design.

From both ASSURE and ADDIE models you must have understand that the instructional design (model) is a process for generating strategies devoted almost exclusively to seeking ways to close a performance discrepancy (gap) that is caused by a lack of knowledge and skills. Of course, ADDIE can be used to promote strategies that move away from simple didactic, limiting, passive, singular modes of design, and instead, move toward designs that facilitate active, multi-functional, situational, inspirational and effective approaches to learning.

5.3.3 Universal Design

The concept of Universal Design has its origin in architecture providing for design of products and environments to be usable to the greatest extent possible by people of all ages and abilities. It has also acquired its significance when applied to education and learning. Universal design puts high value on both diversity

and inclusiveness of learners and appropriateness of teaching techniques, curricula, and assessment in education.

Universal Design in Education

UD has been applied to many educational products (computers, websites, software, textbooks, and lab equipment) and environments (dormitories, classrooms, student union buildings, libraries, and distance learning courses). Unlike an accommodation for a specific person with a disability, the practice of Universal Design in Education (UDE) benefits all students, including those who are not receiving disability related accommodations from the school. Universal design applications in education cover different settings: physical spaces, information technology (IT), instruction, and student services.

While courses, technology, and student services are typically designed for the narrow range of characteristics of the average student, the practice of UDE considers people with a wide range of characteristics in the design of all educational products and environments. UDE goes beyond accessible design for people with disabilities to make all aspects of the educational experience more inclusive for students, parents, staff, instructors, administrators, and visitors with a great variety of characteristics. These characteristics include those related to gender, race and ethnicity, age, stature, disability, and learning style. Universal design can be applied to all aspects of instruction — teaching techniques, curricula, assessment — as indicated in the following guidelines (Sheryl Burgstahler, 2012; at <http://www.washington.edu/doit/universal-design-education-principles-and-applications>).

- *Class Climate:* Adopt practices that reflect high values with respect to both diversity and inclusiveness.
- *Interaction:* Encourage regular and effective interactions between students and the instructor and ensure that communication methods are accessible to all participants.
- *Physical Environments and Products:* Ensure that facilities, activities, materials, and equipment are physically accessible to and usable by all students and that all potential student characteristics are addressed in safety considerations.
- *Delivery Methods:* Use multiple, accessible instructional methods that are accessible to all learners.
- *Information Resources and Technology:* Ensure that course materials, notes, and other information resources are engaging, flexible, and accessible for all students.
- *Feedback:* Provide specific feedback on a regular basis.
- *Assessment:* Regularly assess student progress using multiple, accessible methods and tools and adjust instruction accordingly.
- *Accommodation:* Plan for accommodations for students whose needs are not met by the instructional design.

(Note: For an interesting presentation, you can even see a video *Equal Access: Universal Design of Instruction* at www.uw.edu/doit/Video/ea_udi.html, which was accessed on 30-4-2017).

Universal Design for Learning (UDL)

The goal of UDL is to use a variety of teaching methods to remove any barriers to learning and give all students equal opportunities to succeed (<https://www.understood.org/en/school-learning/assistive-technology/assistive-technologies-basics/universal-design-for-learning-what-it-is-and-how-it-works>).

Understanding UDL: Even if you are not familiar with the phrase “universal design,” you have most likely encountered many examples of it in your everyday life. Closed captions, automatic doors and accessibility features on smartphones are all examples of universal design. These design elements help all people including those with disabilities. For example, the closed-caption option on TVs allows people with hearing impairments to see text onscreen of what is being said. At the same time, closed captioning benefits everybody. If you have ever tried to watch the news or a game in a noisy restaurant, you probably used the closed captions to follow along.

Three Main Principles of UDL: UDL provides that same kind of flexibility in the classroom. The goal of UDL is to present school subjects so that all learners can access the information, and to give learners different ways to demonstrate their knowledge. UDL is based on three main principles:

- **Representation:** UDL offers information to the learners in more than one format.
- **Action and expression:** UDL gives the learners more than one way to interact with the material and to show what they have learned.
- **Engagement:** UDL looks for different ways to motivate students.

Recognizing that the way individuals learn can be unique, the UDL framework, first defined by David H. Rose of the Harvard Graduate School of Education and the Center for Applied Special Technology (CAST) in the 1990s (Orkwis and McLane, 1998) calls for creating curriculum from the outset that provides *multiple means of*:

- *representation* to give learners various ways of acquiring information and knowledge,
- *expression* to provide learners alternatives for demonstrating what they know, and
- *engagement* to tap into learners’ interests, challenge them appropriately, and motivate them to learn.

UDL is intended to increase access to learning by reducing physical, cognitive, intellectual, and organizational barriers to learning, as well as other obstacles. UDL principles also lend themselves to implementing inclusionary practices in the classroom.

Learning and attention issues and UDL: UDL presents information in ways that adapt to the learner, instead of asking the learner to adapt to the information. It all depends on how curriculum is made more accessible. Curriculum developers and teachers can consider the following steps while selecting instructional materials that are supportive and inclusive of students who have wide disparities in their abilities (*Ibid*):

- a) Provide all text in digital format.
- b) Provide captions for all audio.
- c) Provide educationally relevant descriptions for images and graphical layouts.
- d) Provide captions and educationally relevant descriptions for video.
- e) Provide cognitive supports for content and activities.

We find great relevance of the above steps in the context of formulating a universal design of instruction for effective distance education. The instructional software in distance education should incorporate these flexible features that provide access to students with various types and degrees (dis)abilities.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

2) What do the following acronyms stand for?

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ii) ADDIE

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5.4 THEORIES OF LEARNING: IMPLICATIONS FOR DISTANCE EDUCATION

In this section, we examine the application of the theories of learning in the process of teaching/learning in distance education. Prior to this, let us recall from Unit 2 of Block 1 that individualisation and autonomy of various degrees characterise a distance learner, and he learns through mediated communication.

All learning in distance education is essentially a personal activity. Every distance learner works on his own and at his own pace for which there is need for individual tutoring, as may be required. From this point of view, the theories of learning and communication become more important to study in distance education than in the formal classroom learning.

Given the limitation of space and context, we will present the gist of these theories and their implications for distance education.

5.4.1 Behaviourism

The behaviourists stress on the connection between stimulus and response in the organism, and learning through this procedure is a change in human behaviour. Skinner (1953 and 1968), a prominent behaviourist, propagated operant conditioning and viewed that behavior (in the process of learning) changes as per its immediate consequences — pleasurable or unpleasant. Learning objectives are divided into a large number of small steps. Learning occurs through the process of stimulus and response to bring in change in human behaviour. The set of responses at each step of learning is strengthened so that they recur in future and cause more learning. To strengthen the reoccurrence of the set of responses to cause more learning both positive and negative reinforcement are given.

Implications for Distance Education

The two major practical contributions of behaviourism to education are *programmed instruction* and *teaching machines*. The technology of programmed instruction has direct bearing on the process of teaching/learning in distance education. Both the principles of programmed instruction and electronic devices like audio and video cassettes, computers, filmstrips, etc. can be successfully used in distance teaching/learning. The two principles — that students take active role in learning and they proceed at their own pace — greatly help a distance teacher to design self-instructional materials and other devices for effective learning through the process of two-way communication.

Moreover, every exercise in learning (in distance education too) is to produce pre-determined or desired behaviour in the learner. This principle helps in identifying the aims and objectives of a course unit in terms of learner's terminal behaviour. Accordingly, the subject matter is divided into small steps and presented in a logical sequence. At each step the learner is provided with especially positive reinforcement in terms of questions on self-check exercises followed by relevant answers almost immediately.

The learning materials, machines or electronic devices are used to reinforce learning and to support individual pacing of the autonomous distance learner. These make it possible for a learner, who is forced to give up learning activities for a long period of time, to come back to undertake them from where he left off. This has obvious implications for distance education at a time when it tries to facilitate *continuing education* and to establish a *learning society*.

Assignments form an integral part of the packages of learning materials in distance education. They are designed to serve three important purposes: to *pace* students' learning, to *grade* their performance, and to give them *feedback* about their progress. So assignments are the tools which provide *reinforcement* to the distance learners.

5.4.2 Cognitivism

Cognitivism uses the metaphor of the mind as computer: receiving information; processing information; and giving an output of it. Cognitive approach to learning is thus concerned with the inner psychological functioning of an individual. The

stress is laid on how a learner remembers and retrieves information from the memory. Instead of being a mechanical sequence of stimulus and response, learning takes place through insight and successful problem-solving. Information processing, learning as a cognitive process, and feedback from the consequences of one's own action are the three basic components of cognitive approach to learning. Bruner (1966), a cognitive learning psychologist, describes learning as a cognitive process in which there is acquisition of new knowledge, transformation of acquired knowledge, and checking the adequacy of acquired knowledge.

Implications for Distance Education

As the primary emphasis in distance study is long-term learning, the cognitive approach appears to be better suited to distance education. Thus, various principles of learning emphasised by the cognitive theorists have also influenced the practice of distance education. There should be repeated application on the part of the distance learners to find solutions to the problems through discoveries concerning their course of study. Obviously, therefore, the principle of discovery is to be followed in planning teaching/learning materials.

The self-instructional material should ensure active involvement of the distance learner with such content that enable him learn without external reinforcement and approach learning as an act of discovery (to rediscover the facts) so that he may exercise autonomy in learning through self-reward. Besides, the learner when presented with problems, and made to solve them, develops the habit of self-learning through the process of problem-solving.

The four major requirements of instruction referred to by Bruner (Holmberg, 1981) are:

- i) developing in the learner a predisposition toward learning by specifying experiences;
- ii) simplifying information for the learner to generate new propositions and to manipulate a body of knowledge;
- iii) specifying the most effective sequence to present the material; and
- iv) specifying the nature and pacing of extrinsic and intrinsic reinforcement.

These requirements are also applicable to distance teaching in terms of providing instruction step-wise from direct experience to representation of experience to symbolic representation.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under "Answers to 'Check Your Progress' Questions".

- 3) i) Describe the grounds on which both behaviourist and cognitive approaches to learning have complementary contribution to distance education.

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ii) List the differences between the implications of behaviourist and cognitive approaches to learning for distance education in terms of 'learning' and 'feedback'.

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5.4.3 Gagne’s Synthesis

Gagne (1985) synthesised the approaches to learning given by both the behaviourists and the cognitive theorists. For him, learning is a change in human disposition or capability that takes place inside an individual’s brain. He puts forward hierarchical conditions of learning and identified eight phases or types of learning that include both internal and external events. These phases range from a learner’s attention to the stimulus to generalisation to transfer of learning for solving new problems. These types/phases begin with simple form (signal learning) and end with the most complex one (problem solving).

Implications for distance education

Gagne’s synthesis of learning has significant implications for distance education. Instruction should be designed in such a way that the second step is taken only after the first is thoroughly accomplished. These sequenced events successfully guide the distance teachers, the television script writers, and the course writers. The course materials are to be written in such a way that each unit stimulates the learner to recapitulate what has been learnt in the previous unit. You can notice this from the units of previous Block (Block-1) to this Block that you are now going through. In distance learning the learner goes through the stimulus materials or course materials only when he is *ready* to learn. He is also provided with guidance whenever called for through correspondence, and personal contact programme at study centres. Feedback is provided through *comments* on the assignments, and there is *continuous assessment* of his performance through more and more learner-assignments. The self-instructional materials are written in such a way that the learner is able to practice the varied tasks using one particular skill at a time and based on that proceed to another.

Gagne has also been specific on the choice of media. In distance education too, one can make a tentative medium choice for each instructional event and then review the list of tentative media before making the final choices. It is the *instructional events* within lessons rather than the level of the lesson that determine media selection.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

4) Relate Gagne’s synthesis of the two learning theories (viz. behaviourism and cognitivism) to designing self-instructional materials for distance education.

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5.4.4 Bloom’s Theory

Bloom, et al (1956) classified the learning outcomes into three domains — cognitive, affective and psychomotor —with greater emphasis on the cognitive domain. The cognitive outcomes of learning are classified under six headings, viz., knowledge, comprehension, application, analysis, synthesis, and evaluation, which have later been revised by Anderson and Krathwohl (2001) as remembering, understanding, applying, analyzing, evaluating and creating. Through the process of ‘task analysis’ educational behaviours can be classified from simple to complex based on the level of learning.

Educational implications

The basic application of Bloom’s model to distance education is that the separate stages of learning in cognitive domain can guide the course designer to decide upon the objectives of the course, and can help him choose the best from the various media available for the purpose. In the selection of medium/media, learning objectives must be one of the deciding factors. For example, if the objective is ‘affective’ in nature, face-to-face contact, television or radio with some complementary activities may be more suitable than others. But, if the objective is ‘cognitive’ in nature (e.g., analysis of a philosophical concept), the printed text will probably be more effective. For psychomotor learning (e.g. learning a skill), again direct confrontation of TV viewing with supporting home kits may be more promising.

Besides these, objective of learning can be expressed in behavioural terms that can be observed and measured. Moreover, evaluation of learning outcomes can be based on these three domains of learning.

Check Your Progress

- Notes:** a) Space given below the question is for writing your answer.
b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.
- 5) State how Bloom’s contribution may be made use of in distance learning.

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5.5 THEORIES OF COMMUNICATION: IMPLICATIONS FOR DISTANCE EDUCATION

Communication generally understood by many is the process of interaction between the sender(s) and the receiver(s), and in this process information is transmitted from the former to the latter with immediate or delayed feedback from the latter. In distance education the learners are at a distance from the teacher, and the teaching-learning activities are carried out through the process of two-way communication. Obviously, it matters a lot as to how information is transmitted from the source to the destination, and feedback from the latter to the former. Unlike the traditional classroom where there is interpersonal communication, in distance education interaction goes on through *mediated communication* in which various media including the ‘print’ play important roles. So, an understanding of communication theories is central to a distance educator, for it offers an additional conceptual viewpoint in examining the use of media for course construction or design. In what follows is a brief account of the implications of the four theories of communication for distance education.

5.5.1 Mathematical Theory

We consider mathematical theory a representative line of thought which emphasises the maximal and effective use of electronic means in transmitting and receiving information from the source to the receiver, and vice-versa. The contribution of this emphasis has been the gradual rise in the quality and quantity of information passed on thorough the various media of communication. Mathematical theory of communication symbolises the urge of man to harness nature and evolve technologies to make non-face-to-face communication easy and effective. Advances in technology have materialised this urge to a great extent, and, as a consequence, educators may choose one of the available media as their primary medium of instruction. And so may the distance teacher or learner use the suitable medium/media.

5.5.2 Information Theory

Information theory studies the quantification, storage, and communication of information. The obvious implications of this theory for distance education are in the area of course preparation, a process which comprises course planning, course development and course production. As these subordinate processes have been dealt with adequately in subsequent Blocks of this course, suffice it to say here that the systems of distance education have amply drawn on the insights provided by the information theory, be it the selection, presentation or modification of teaching materials.

5.5.3 Free Press and Social Responsibility Theories

The free press theory upholds freedom of expression, which has direct implications for freedom of learning, that of teaching and educational communication. The learner should be able to get what he is looking for, and the institution should be able to give what it is approached for. Education has to be a free enterprise. The social responsibility theory emphasises that in a democracy the media, though independent, have to function within a framework of social responsibility. This principle too has direct implications for education, which cannot be socially irresponsible.

It should be noted that the press (print) and the other media are the means of mass communication, and that open and distance education too effect mass communication using the same means, i.e. the print and the other media. In the ultimate analysis the function of ODE is not very different from that of the press and the media, namely, educating the masses, democratising and universalising education. Education has to be a free enterprise, and more so open and distance education. It has to be so both in terms of its content and its operational aspects. ODE is subject to public criticism at each and every stage of its operation as its content too is open to all, and is thus a socially responsible free educational enterprise.

5.6 PRACTICAL IMPLICATIONS OF THEORIES FOR DESIGNING SLMs

In the foregoing sections (i.e. 5.4 and 5.5 above), we discussed the broad implications of the theories of learning and communication for open and distance education. We now turn to the practical aspects of these implications for a distance educator or distance teacher. The society and the academics in particular and the distance learner in particular expect a distance educator to do, at least, as much as a teacher does in a classroom situation. How will the distance educator achieve the objectives which a classroom teacher does in his/her classroom? A straightforward way of answering this question is:

- i) to see what the trained classroom teacher does, and then
- ii) to see how the distance educator too might achieve the same objectives or results.

You are aware of the following basic functions that a teacher performs in the classroom.

- Teacher sets the tone of his classroom

- Motivates the learners to draw the learners' attention
- Builds a warm classroom environment
- Teaches the class to impart knowledge, skills, attitudes through properly planned and prepared lesson plans
- Provides instructional materials that facilitate active learning among the students.
- Listens to, look for or sense the signs of trouble in the students.
- Encourages, guides and nurtures students in their learning activities
- Acts as a mentor, teacher and an advisor for students
- Manages student behavior in the classroom by establishing and enforcing rules and procedures.
- Maintains discipline during teaching in the classroom in accordance with the rules and disciplinary systems of the school
- Instructs and monitors students in the use of learning materials and equipment.
- Uses relevant technology to provide differentiated instruction.
- Develops schemes of work, activities and tests that are in accordance with established procedures.
- Encourages and monitor the progress of individual student and use information to adjust teaching strategies
- Evaluates student progress
- Provides appropriate feedback on student's work or performance.

Most of the time a classroom teacher spends is in presenting the prescribed materials which are available in the form of text books or some other form. The classroom teacher is supposed to breathe life into that text/material and help the learner communicate with it effectively for his successful learning.

We need to see how the distance teacher/educator too might perform the same tasks to achieve similar objectives or results vis-a-vis distance learners. Since the distance teacher has to depend primarily on specially designed self-learning material in which he lives for his students to enable them achieve such objectives. Designing of self-learning materials depends on the synthesis of implications of the theories of learning and the theories of communication. Learning theory is concerned with the process of acquiring knowledge, skills, and behaviour. Communication theories, as applied to education, with the forms and means of interaction between learners and teachers, guide us to make the presentation of content or discussion more interactive. The collective implications of these theories to various aspects of designing self-learning materials are presented below.

5.6.1 Presenting the Materials

Materials being presented depend on the nature and type of the course and its format. If the course is independent of any prescribed texts, the material to succeed should reflect the following features:

- i) **Intellectual clarity:** The logical analysis of the material will suggest the best order in which the various sub-themes of a particular theme may be presented in any format. Such an order will maintain both the continuity and the consistency of what is presented
- ii) **Linguistic simplicity:** To promote self-learning, the materials should be presented in simple language. Simplicity of expression is achieved by using common words, short and simple sentences, expressing ideas and concepts clearly, adopting a personalised style, and bringing in a touch of humour wherever possible.
- iii) **Concretisation:** It is easier to understand the concrete than the abstract. In order to concretise what we may be presenting to our learners, it is advisable to present illustrations, diagrams or devices like lexivision (in which pictures, etc. and words are put together to explain a difficult concept)
- iv) **Appropriate media:** Research and experience have shown that in absolute terms learners learn equally successfully from any medium, be it print, audio or video. However, depending on what material is to be presented and to whom, one medium does show a relative advantage over the other. Yet, the choice of the medium should be governed by the considerations of cost-efficiency (for more details refer sub-section 6.2.2 of Unit 6 in this Block).

5.6.2 Identifying the Objectives

The syllabus and, very often, the prescribed text itself makes it clear as to what educational objectives are to be achieved through a particular course. In self-instructional materials, the role of the teacher may be achieved by listing clearly what the objectives of a particular course unit are. Still better is to list these objectives separately if they pertain to different domains – cognitive, affective and psychomotor. The objectives need to be stated in *behavioural terms*, i.e., the course unit should indicate it clearly as to what the learner should be able to do after he studies/works through the unit. In addition to *the domain specification of objectives*, we must be clear about the various levels of stating the objectives for a particular purpose.

5.6.3 Motivating the Learner

To reduce distraction, the teacher provides motivation. He brings learners to a state of readiness, in which learning takes place more easily. All of us know of teachers whose very name or presence provides enough motivation for a successful academic exercise. And then, there are teachers who are de-motivating in more than one way/sense and known to the students in conventional set-up. Similarly, self-instructional materials, like live teachers, may be highly motivating, moderately motivating or de-motivating. The degree of motivation which such materials cause among the learners depends on the nature of the *externals* and *internals* of these materials.

Ultimately, it is the quality of the material presented which motivates the learners. In this connection, it has been observed that the materials prove to be highly motivating if they:

- fulfill the needs of the learners,

- exploit the experiences of learners,
- use personalized style in presenting information, etc.
- set interesting and enjoyable exercises,
- provide ample feedback,
- present assignments in order of their difficulty levels, and
- present study units of moderate length.

5.6.4 Exploiting Learners' Experiences

Good classroom teachers build on learners' experiences. One and the same concept may be brought home to rural learners with the help of their experiences, and to those of urban learners with theirs. Similarly, one of the ways of motivating the distance learner is to exploit his/her experiences in the materials presented to him. Besides motivating the learners, such an approach, helps the course writers to take the learner from what he/she knows or has experienced to what he/she does not know or hasn't experienced. The course designer put it into practice in at least two ways.

5.6.5 Providing Learning Activities

Once a new concept is taught, or a new piece of information is given, the teachers promote learning through learning activities. For example, after having taught a formula, the teacher asks learners to apply their learning to work out solutions of a few questions. Self-instructional/learning materials should provide for learning activities or exercises or assignments of various kinds. Of course, the variety of activities depends on the resourcefulness of course writers. And all these can be effectively incorporated with the help of suitable instructions built in the study units.

5.6.6 Facilitating Retention

The learner should be able to retain (what he may have learnt) in his memory — both short-term and long-term. Good teachers use different ways and means to help their students to improve their retention through exercises, among others. A well-known technique of helping distance learners to improve their 'retention' is to provide frequent repetitions at appropriate intervals. This can be done by presenting adequate number of illustrations, appropriate explanations, etc., in the self-instructional/learning materials. In-text questions, sub-sectional summaries, assignments, etc., make them clearly understand what is taught. Thorough understanding helps the learners in abstracting what is learnt which is easy to remember. Problem-solving approach to learning also helps 'retention'. Therefore study units should provide opportunities for applying what has been taught and learnt.

5.6.7 Promoting Transfer of Learning

The learner should be able to transfer his learning to various issues within a discipline or across different disciplines. For example, if we have learnt about the notion of relativity in physics, we should be able to think of a different kind of relativity in sociology. Besides, transfer has yet another meaning — facilitating further learning. A learner may be said to have achieved leaning perfectly only if he can transfer his learning to new situations within a particular discipline and

also across disciplines, if necessary. Obviously, one of ways of promoting such a higher level of learning self-instructional materials is to send the learner through more complex application and problem-solving type exercises such as application of learning/knowledge in identification of similarities/parallels and dissimilarities.

5.6.8 Providing Feedback

For successful distance teaching-learning it is essential to provide opportunities for two-way feedback — from the learner to the teacher, and vice versa. It is a means for providing the necessary correctives, revisions, modification and repetitions needed in the process of teaching and learning. Self-instructional materials provide such two-way feedback with the help of devices such as unit structure, sum-up section, assignments, answers to ‘check your progress’ questions.

5.6.9 Providing Guidance

All the above eight sub-sections constitute guidance about the course. We may list certain other aspects of self-instructional materials such as the following, among other things.

- *Good introduction:* It helps in building links with what has gone into the course earlier, indicate what follows and in what order, etc.
- *Anticipating questions:* Good course writers anticipate questions and provide their answers to the questions in study units by way of simplifying a different concept, exemplifying it in different ways, focusing on essentials, leaving out non-essentials, etc.
- *Typography:* Different type faces and sizes, multi-coloured print, division headings, differing shades, etc. can provide guidance to learners as they get more and more familiar to the logic behind the typography used.

We may extend the meaning of guidance to cover various other considerations such as emotional, domestic, time management, etc.

5.6.10 Conclusion

In the above nine sub-sections, we have tried to show that self-instructional/learning materials can perform the functions of a classroom teacher, and similarly a distance learner may have those very learning experiences which a learner may have in a classroom situation. Of course, the success of such materials depends on their quality.

What has been suggested above is an elaboration of the issues involved in attempting to link theory with practice. It may not be possible for course writers to accommodate all of them while preparing a course unit. We may therefore reduce the entire discussion to two notions:

- access devices, and
- learner-active materials.

Access devices are those means which help the learner to reach (grasp) what is presented in a study unit. Obviously, introduction, section headings and sub-section headings, explanations, diagrams, glossaries, etc. are all access devices. *Learner-active materials* are those which have to be worked through. A self-

instructional/learning unit, thus, must be learner-active, possessing an adequate number of access devices to achieve its objectives.

This brings us to the notion of unit design. How should a study unit look like? Any unit of this Block or any other Block of this course is an of the unit design. It is mainly the course writer or the unit designer or course coordinator has to decide on the best possible sequence/arrangement of components which constitute the presentation of the main theme, sub-themes, and how they are to be presented. For an example, you revisit Block introduction given in Block -1, where skeletal structure has been presented. Accordingly you can the unit structure and the presentation of the contents in a unit of the Block.

5.7 KEY CONSIDERATIONS OF DESIGNING SLPMs

SLPMs, though called so, they focus more on learning than on teaching or instruction. These are based on the needs of individual learners and not on the interests of teachers or open learning institutions. These provide to students as much control as possible over their learning. That is why what were earlier called self-instructional print materials (SIPMs) are rather called self-learning print materials (SLPMs) these days. However, often SIPMs and SLPMs are interchangeably used and they mean the same materials.

In this section, we will take a look at key considerations such as principles, features and the process of designing Self-learning Print Materials (SLPMs).

5.7.1 Principles

Gagne (1970) and further updated by Gagne and Briggs (1974) outlined nine instructional events and corresponding cognitive processes that must occur for learning to take place. Gagne, Briggs and Wager (1992) listed nine instructional events and corresponding cognitive processes that must occur for learning to take place. These events serve as basic principles for designing instruction and selecting appropriate media. They can also be used in conjunction with Bloom's revised taxonomy to an engaging and meaningful design of SLPMs. These events are elaborated below as important principles of designing SLPMs.

- i) ***Gaining attention of the learners*** (reception): As the first instructional event it involves getting the attention of the learners. They get motivated to learn when they are curious. So, drawing and maintaining their attention is an important task requiring provision of a set of conditions involving change, novelty, surprise, thought-provoking questions, etc to make the materials interesting, attractive and motivating for the learners to read the materials attentively.
- ii) ***Informing learners of the objective*** (expectancy): Once the learners are interested in the material, it is necessary to inform them about the learning objectives involved in the instruction. Objectives serve as the basis for not only organizing the instruction but also assessment. If they understand the objectives, they will be alert to the key elements of the instruction and participate in the learning. The purpose here is to create a sense of expectancy among the learners. The materials must state the objectives precisely before

the actual instruction begins. In other words, the learners must be informed about the objectives; what they are to learn during the course or what is expected of them. This will help the learner establish criteria for his standard performance.

- iii) **Stimulating recall of prior learning** ((information retrieval): When the learner reads something new, he/she must first be able to associate it with what he/she already knows so as to comprehend the new concepts being studied. It is easier for the learner to grasp information when there are connections made to their prior learning experiences. Existing knowledge/experiences are reviewed and linked with new knowledge. We know that ensuring recall of previously acquired knowledge is an essential condition for furthering of learning. Methods for stimulating recall of prior learning include: asking appropriate questions about previous experiences, understanding of previous concepts, etc.
- iv) **Presenting the stimulus** (selective perception): It involves presentation of the content. To make the instruction more effective and efficient content should be organized in a meaningful way. To respond to different learning styles, the distance educators should present content in different learning environments appropriate to learners. It is important to use *appropriate language* – simple, clear and unambiguous words/sentences – to make communication effective. Simple and conversational style of language enhances the readability of the text. Use of a variety of media to address different learning preferences through multiple versions of the same content, e.g., text, audio, video, demonstration, podcast, group work etc will present diverse stimuli to diverse categories of distance learners.
- v) **Providing learning guidance** (semantic encoding): While the learners work to learn new information, guidance is necessary for them. In self-learning materials it may be done in different ways such as the following: a) *Advance organizers* presented at the beginning/introduction stage perform this instructional function of guiding the learners and providing educational scaffolding for them. SLMs shun the idea of compartmentalization of units or lessons. Each unit usually contains a brief introduction, which, presents an overview of what the learners have already learnt/studied (i.e. pre-knowledge) in the previous unit(s), introduces the new learning points/experiences to the learners. This helps in establishing a bridge between what the learner knows and what he/she is going to learn. ; b) *Combination of verbal and non-verbal instruction* can be used to provide effective clues, hints or directions. Use of non-verbal aids such as illustrations, diagrams, charts, tables, etc. play a vital role in making self-learning materials more effective. However, non-verbal items should not be looked upon as an alternative technique of presenting knowledge, and therefore they are not a substitute for written exposition. They are complementary or supplementary aids to the interpretation of verbal representations. Use of analogies, examples, case studies and other devices to support learning for better comprehension of the information; c) *Presenting glossary* of new or technical terms/concepts, wherever necessary, will help to ensure better comprehension of learning points on the part of learners. The glossary may contain working definitions of all the crucial/key, terms, concepts or expressions introduced in a unit. It refreshes and clarifies the learners' comprehension. Glossaries may be given at the end of the unit.

- vi) ***Eliciting performance*** (responding or practice): To ensure the students are learning the material, they may be asked to practice new knowledge and skills. The instructor needs to activate their processing so as to help them practice and internalize new skills and knowledge as well as to confirm correct understanding of the concepts. The learners are prepared to create outputs based on content/concepts they learnt. Some of the effective ways of eliciting performance include: providing learner activities (assignments, etc), adopting recall strategies (deep-learning questions), facilitating elaborations and providing more complexity to their responses, enabling them integrate new knowledge with prior knowledge and providing real-world/life examples. Further engaging them in discussion will help determine the level of understanding.
- vii) ***Providing feedback*** (reinforcement): While studying the unit the learners should know whether they are on the right track or not. Once the educator or instructor has determined the learners' level of understanding of the instruction, feedback is necessary to help them understand the material better. There should be immediate, constructive and formative feedback on his/her performance. Various provisions of providing feedback include: in-text question-answers, self-check or check your progress questions with answers at the end, exercises, proper evaluation of assignments, academic counseling, tutorials, etc. Analytical feedback provides the learner with suggestions, recommendations, and information to correct their performance.
- viii) ***Assessing performance*** (assessment retrieval): In order to evaluate the effectiveness of the instructional events, you must test to see if the expected learning outcomes have been achieved or not. You should assess the performance based on previously stated objectives. Multiple levels of learner assessment are encouraged, and summative assessment should occur when the instructor believes that the learners have been given opportunity to respond to the formative assessment. The outcomes derived from the assessment of performance should also be used to modify instructional events (objectives, guidance, etc.). The outcomes of learning need to be assessed as frequently as possible. Remediation is to be worked out and remedial learning material and experiences provided to the learners to improve performance before final assessment of learners' performance.
- ix) ***Enhancing retention and transfer*** (generalization): The last event of instruction is to reinforce the retention of information through application and transfer. An instructor may review the material that was learned in a lesson prior to the lesson being taught to ensure that the previous material has been recalled. For remembering, we need to provide for spaced review, which has often shown to be an effective technique. We need to carefully include a series of problems to develop the skills of transfer of learning. This is the process in which new ideas are compared and contrasted to relate one's previously learned ideas. Under this condition we show examples and statements and ask learners to identify concepts learnt, present reflective questions / activities. Effective SLMs provide situations to remember and transfer of learning as one of the essential functions of instruction. To help learners develop expertise to generalise, they must internalize new knowledge and create concept maps or outlines, templates, wizards, etc.

Summary: ‘Sum up’ is presented at the end of each unit to help the learners integrate what they have studied. The learners need not read the whole unit again but read the summary just to grasp the main ideas/points presented in the unit. Besides recapitulating what has been discussed in the unit, the summary helps the learners know whether they have achieved the objectives of the unit.

The above nine events of instruction presented as principles of designing self-learning materials can help build the framework with which to prepare and deliver instructional content in distance teaching and learning.

5.7.2 Key Features

From the principles of designing SLPMs discussed in sub-section 5.7.1 above presented you a fair idea of how an SLPM would look like. SLPMs are characterized by certain features. Though these features vary a little depending upon the objectives / purpose and style of presentation, there are a few constant features of SLPMs. Let us look at the important features of SLPMs below.

Self-explanatory

The SLPMs are self-explanatory in the sense that the student can study through learning materials and understand the content without much external help, support or guidance. Therefore, these materials should be free from any ambiguity in terms of content, presentation and language. The content should be logically arranged and the presentation should be simple and effective, and explain everything to help the learner learn or promote his/her learning.

Self-contained/self-sufficient

SLPMs should be self-contained or self-sufficient. All the essential content required by the student to achieve the course objectives is to be included in the SLPMs. The student need not hunt for additional readings or materials to accomplish his/her objectives because of problems in accessing additional materials. At the same time, LPIMs should not be overloaded with too much content or learning tasks to the point of intimidating the learner.

Self-directed

One of the important functions of an effective distance teacher is to direct the students to acquire the necessary knowledge, skills and attitudes on their own. Therefore, SLPMs perform the function of an effective teacher by providing the learners the necessary guidance, hints and suggestions at every stage of their learning process. Learning is directed by presenting the content in a logical sequence, explaining the learning concepts according to the level of the students, providing appropriate learning activities and presenting illustrations to make the content easy to understand.

Self-motivating

Motivation is a pre-requisite to effective learning. SLPMs should have potential to arouse, direct and sustain interest and motivation in students. The content should arouse curiosity, raise problems and relate knowledge with the familiar situation of students so that the students feel motivated and their learning gets reinforced. This type of motivation and reinforcement should be provided at every stage of learning.

Self-learning

SLPMs are based on the principles of programmed instruction. The features of programmed instruction such as specification of objectives, breaking the content into small (but manageable) steps, sequencing learning experiences, providing feedback, etc., are incorporated in SLPMs. Thus, a systematic approach to learning is followed in the preparation of SLPMs. These features of SLPMs equip or make the students learn independently and also enable them to devise their own learning strategies and learn on their own.

Self-evaluation

SLPMs provide appropriate feedback to the students to ensure optimum learning. They provide information to the students on whether they are progressing in the right direction. Self-check exercises, in-text questions, activities and other forms of exercises give the learners the much needed feedback about their progress. Needless to say, feedback on the progress reinforces and motivates them to learn and proceed from one learning point to another. In other words, the knowledge of result of their learning gives positive reinforcement to the learners to learn further. For development of SLPMs with the above characteristic features, there is a need to involve people with specialized knowledge, skills and competencies. It means the distance teachers are expected to possess knowledge of not only the principles of designing SLPMs but also their characteristics, among others, in order to involve themselves in developing effective SLPMs.

We shall discuss the process of designing SLPMs in the sub-section that follows.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

6) State the important features of SLPMs.

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5.7.3 Process

Designing SLPMs is like preparing a blue print of SLPMs, which together form a design of a course / programme of distance education institution. Once a course / programme has been designed, then only course preparation begins by way of writing and developing the units of SLPMs follows. We shall discuss here only the main steps or the stages the course designers should follow while designing courses for distance learners.

- i) **Need assessment:** The first and foremost step for designing any course is to know the educational needs of the target group. Needs can be assessed using various research tools and techniques. Specially mounted studies can be used to assess the needs. Besides, we can take help of other agencies involved in the particular area of education or development. The felt needs of the target group and the needs unfelt by the target group but perceived by teachers and others will provide the basis for the selection of content to be included in the unit, objectives to be set, illustrations to be used to support discussion, etc. Need assessment would also help us know the characteristics of the target group such as their learning habits, language competence, educational qualifications, socio-economic background, etc. Moreover, need analysis can help in identifying the right kind of course writers, editors, etc. for writing and editing the course(s).
- ii) **Defining objectives:** Need assessment will give us ideas about the objectives we have to set for the learners. In other words, need assessment will reveal as to what the target group wants or needs to accomplish through a particular course. Defining objectives is the most important part of the course planning and development, as every subsequent decision will depend on the type and quality of the objectives defined. A well defined objective specifies the information or action that the teachers want the students to learn. Therefore, it is necessary that a well thought out decisions are taken while defining the objectives. The objectives should be achievable; the students should be able to achieve them within the specified time and with resources made available to them. The point is that objectives should be realistic to the needs of the target group.
- iii) **Identifying and organizing the content:** It is essential to identify the necessary content appropriate to achieve the set objectives. After identifying the contents they need to be organized in view of the objectives. This will provide the broad framework of the contents of the course or a concept map of the overall content.
- iv) **Analysing resources and constraints:** We have to take stock of the resources available at the disposal of the institution, those that can be mobilized from outside and those possibly available with students as well. These resources should be sufficient to manage all the processes involved in planning, development and transaction of a course / programme. A decision as to which media would be used to deliver which course is to be taken at the planning or designing stage itself. If we have access to more than one medium, we need to think of integrating them in the most appropriate way. Here, the practical components, if any, involved in a course need thorough consideration. If the course needs residential contact sessions, there is a need to make all possible arrangements for these? Similarly, we have to examine the provisions to be made to provide to the students access to laboratories, workshops, etc., to achieve the course objectives.
- v) **Selection of appropriate methods, media and activities:** The next step is to determine how best to present our materials to our students. There can be several ways to present learning points and achieve the objectives. We have to select the most appropriate methods vis-a-vis the objectives set, resource available and media available, accessible and affordable. In addition,

selection of the appropriate media and methods depend on various other factors such as the learner preferences, cost, timing, educational effectiveness and the policy of the institution. We will discuss about selection of media and methods, among others, in Unit-6 that follows the present unit.

- vi) **Writing lessons / units:** Preparation of lessons / units is an important stage in designing and development of SLPMs. This is discussed in greater details in Unit-7.
- vii) **Evaluation:** Evaluation of all the components of course design is an essential step in the process of course planning and designing. It will help the designer know as to how students will cope-up with the SLPMs amongst others. Any kind of evaluation at each stage and at the end of final stage will provide the opportunities to review the plan or design of the SLPM prepared.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

7) What are the important steps involved in designing SIMs?

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5.8 LET US SUM UP

In this unit we have explained the concept of instructional design, its process and the relevance of instructional strategies and design models including the universal design in the context of distance education. We have also touched upon two important models of instructional design — “ASSURE (analyze learners, state objectives, select instructional methods, media and materials, utilize media and materials, require learners participation and evaluate and revise) and ADDLE (analyze, design, develop, implement and evaluate) — that provide basis for preparing and delivering learning materials. We have discussed the implications of theories of learning and communication where in the contribution of different schools of psychology like behaviourism, cognitivism and constructivism to the instructional design and the teaching-learning process in distance education. The implications of learning and communication theories in design and development of materials have also been highlighted in the context of distance education in general and with also special reference to designing the SLMs. Towards the end, we have explained the significance of principles, key features of SLPMs as well as the process of designing SLPMs in distance education.

The ultimate outcome of our having dealt with all the above aspects of designing SLMs is enable the distance education course designers to arrive at a good unit-design, which is the crucial factor of SLPMs. We will discuss in detail development of SLPMs in Unit-7.

5.9 ANSWERS TO ‘CHECK YOUR PROGRESS’ QUESTIONS

1) Unlike conventional system, distance education is more learner-centric in its nature. It means, instructional strategies the distance teachers use help shape learning environments and represent professional conceptions of learning and of the learner. Instructional strategies in open and distance education need to encourage active role of the learner in the learning process. Hence, teaching and learning at a distance needs special instructional strategies to help students achieve their course and programme objectives. There exist a range of instructional strategies adopted by open and distance education institutions and are listed below.

- i) Text Material Strategies
- ii) Broadcast Strategy
- iii) Mixed mode or multi-media strategy
- iv) Online Strategy
- v) Supplementary and complementary strategy

The last strategy is important in the sense that it helps in supplementing and complementing the rest of the strategies. It involves the activities like project work, face-to-face contact, peer group discussion, audio-visual materials, teleconference (audioconference, videoconference, and computer conference).

Yet, no one instructional strategy is best by itself and in all situations. Each instructional strategy may be best only in given situation and with particular target group of learners and not necessary for all and in all situations. This is so because of the inherent limitations that these strategies suffer from.

- 2) i) **A** = Analyze learners
S = State standards and objectives
S = Select strategies, technology, media and materials
U = Utilize technology, media and materials
R = Require learner participation
E = Evaluate and revise
- ii) ADDIE is an acronym which stand for **A**nalyze, **D**esign, **D**evelop, **I**mplement, and **E**valuate
- 3) i) Behaviourists propagated programmed instruction and self-pacing in learning. Various electronic devices are used to make self-pacing possible. The cognitivists introduced the concept of autonomy in learning. Both the concepts of self-pacing and autonomy are complementary to each other in their application to distance education.
- ii) From the behaviourist viewpoint distance learning can take place through the process of stimulus-response, and ‘feedback’ comes from

the distance teacher in terms of tutor comments. Whereas cognitive theorists view that the distance learner can learn through discovery, in which case feedback comes from the distance learner himself in terms of successful completion of the learning activity.

- 4) Gagne synthesised behaviourist and cognitive approaches to learning and provided a hierarchy of eight types/conditions of learning moving from simple to complex learning activities. Guided by these views the distance educator, while developing self-instructional materials, presents instructional materials in a chain form ranging from simple to complex activities in which every learning unit is related with the previous one thematically and logically.
- 5) Bloom presented three domains of learning, viz., cognitive, affective and psychomotor. These domains guide a course designer in distance education to “formulate course/learning objectives in behavioural terms. Further, the learning objectives help decide upon the type of media to be used in distance learning/ teaching.
- 6) The important features of SIMs are that they are self-contained, self-explanatory, self-directed, self-motivating, facilitating, self-learning and self-evaluation.
- 7) The steps involved in designing SIMs are: i) Need assessment, ii) Defining objectives, iii) Identifying and organizing the content, iv) Identifying and analyzing resources and constraints, v) Selection of appropriated media, methods and activities, vi) Writing lessons/SIMs unit, and vii) Evaluation.

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5.11 UNIT END EXERCISES

Unit End Questions

You may write brief notes or full-length answers to these questions in your own interest. It might help you during your preparation for examination.

- 1) Discuss different types of instructional strategies followed in distance education. (500 words).
- 2) What is an instructional design? Discuss different instructional design models. Which of them, you think, is best suited for distance education and why? (1000 words).
- 3) Explain the implications of learning and communication theories for distance education. (1000 words).
- 4) What are the practical implications of learning and communication theories for designing of SLMs (1000 words).
- 5) Explain the principles of designing SLPs. (500 words).
- 6) What are key features of designing SLPs. (500 words).
- 7) Explain the process of designing SLPs. (500 words).



Questions for Critical Reflection

- 1) Do you agree that the Unit reflects the points presented in sections 5.6 and 5.7 above? Justify your answer. In case your answer is negative and have written justification for it, for better reflection, you discuss the same with the academic counselors and resource persons whenever you get an opportunity to meet them at your study centre.

UNIT 6 MEDIA AND TECHNOLOGY FOR ODE

Structure

- 6.0 Introduction
- 6.1 Objectives
- 6.2 Media and Technology in Distance Education
 - 6.2.1 Taxonomies of Media
 - 6.2.2 Print, Electronic and Educational Media: Merits and Demerits
 - 6.2.3 Relationship between Media, Technology and DE
 - 6.2.4 Instructional and Delivery Technologies in DE
 - 6.2.5 Learning from Media: Pedagogical Utility
 - 6.2.5.1 Print-based Media
 - 6.2.5.2 Audio-based Media
 - 6.2.5.3 Video-based Media
 - 6.2.5.4 Computer-based Media
- 6.3 Technological Applications in ODE
 - 6.3.1 Applications of One-way and Two-way Technologies
 - 6.3.2 Generations of Distance Education
 - 6.3.3 Technology-enhanced Learning
 - 6.3.3.1 Open Educational Resources (OER)
 - 6.3.3.2 Massive Open Online Courses (MOOCs)
 - 6.3.3.3 M-Learning
- 6.4 Let Us Sum Up
- 6.5 Answers to 'Check Your Progress' Questions
- 6.6 References
- 6.7 Unit End Exercises

6.0 INTRODUCTION

In unit-5, we have highlighted different instructional strategies, instructional designs, implications of theories of learning and communication for distance education and designing of SLMs and key considerations involved in designing the SLPMs. By now, you must have noticed that print medium is the major medium of instruction at IGNOU, and there are other media being used for teaching and learning at a distance. Thus, you understand that media play paramount role in distance education. Without the use of media and technology distance education is just not possible. It is basically through judicious use of media the teaching and learning transactions are carried out in distance education. In other words, the success of distance education is essentially dependent on the effectiveness use of media and technology. In this unit, we therefore attempt to present to you the range of media and technology available for use in distance education along with their pedagogical utilities.

Before we proceed further you may think about the answers to the following questions.

- What role do media play in distance education?

- Can you outline various media and technologies available for distance education?
- Do you know the relative merits and demerits of different media?
- Do you think media affect distance teaching and learning? If yes, how?

If you could get answers to these questions, it's really good. Even if you could not, you do not worry. We will address these questions in this unit. Have a look at the objectives of this unit below.

6.1 OBJECTIVES

After having read this unit, you should be able to:

- explain the role of media in open and distance education;
- establish the relationship between 'media' and 'technology';
- enumerate and explain the taxonomies of media in ODE;
- understand the advantages and the limitations of various media and technologies used in ODE; and
- analyse the effect of media on distance teaching and learning.

6.2 MEDIA AND TECHNOLOGY IN DISTANCE EDUCATION

As indicated earlier, the role of media is central to the success of distance education. Since most of the time learners are at a distance from their teachers and the institution (i.e. quasi-permanent separation of learner from the teacher), the content is delivered using different media. The predominant medium used in distance education is normally the printed text. However, printed text does not and cannot replace teachers altogether. Yet, the invention of the printed text did lead to the re-organisation of teaching and opening of an alternative access to education. The emergence of the print medium and the subsequent introduction of postal system led to opening up of education for those who want to pursue education but could not attend regular classes. Correspondence education thus came into existence and it continued for long. However, over time, the use of 'non-print' media became increasingly popular and thus correspondence education evolved into distance education.

Media differ in their use of symbol systems to represent different kinds of knowledge. According to Solomon (1979) there are three kinds of symbol systems — *digital*, *analogic* and *iconic*. The **digital** systems are text-based and contents are logically related (e.g. books, computers). **Analogic** symbol systems are more expressive and represent performance of dynamic activities (e.g. television). The **iconic** symbol systems depend upon pictures, colors and signs for encoding knowledge. The combined use of these symbol systems greatly influenced the way different media can represent knowledge. We use a combination of media to represent all the symbol systems so that we can enable the distance learner in such a way that he gets what all his counterpart in the conventional system receives. For example, a lecture could be replaced by a printed text, a practical demonstration through a video, discussion through an audio, and so on. Some media are better suited to represent certain teaching tasks. For example, television can provide direct and concrete experiences to learners as it can:

- demonstrate processes or procedures;
- show ‘models’ or construct examples of abstract ideas;
- demonstrate interpersonal communication; and
- dramatise or reconstruct events through documentary style of production (Bates, 1993a).

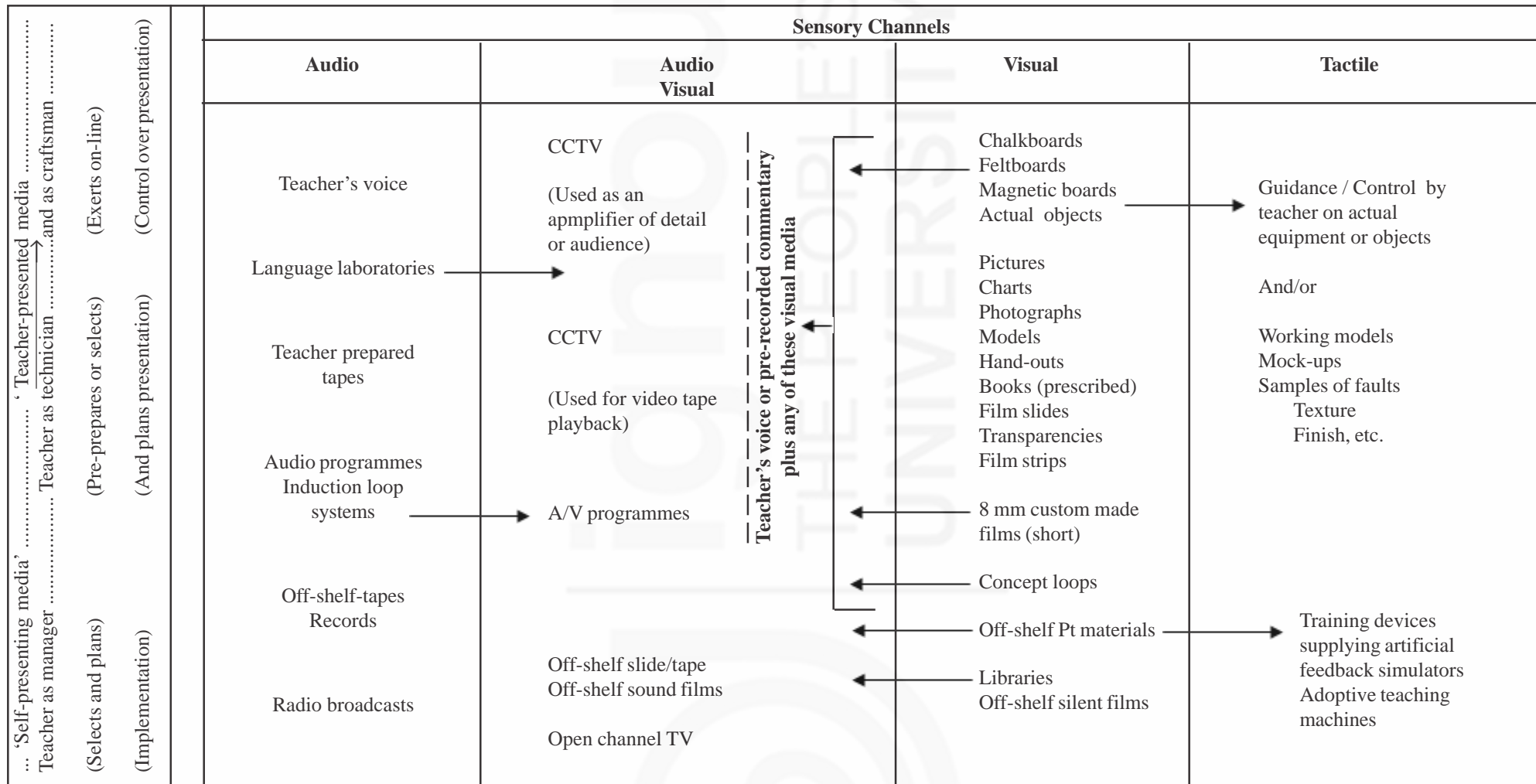
In distance education, a judicious use of ‘media-mix’ could increase student motivation, supplement the main medium, and enable the learner to have control over his learning. Since interaction is essential for effective learning, certain media provide increased opportunity for interaction at a distance. Through effective use of appropriate media, the interactivity could be made as good as face-to-face interaction.

6.2.1 Taxonomies of Media

Though media can basically be grouped into ‘print’ and ‘non-print’, experts have proposed taxonomies of media. Here, we will discuss some of the media taxonomies so as to derive a list of media available for distance teachers and learners. Romiszowski (1974) propounded his taxonomy (See Fig. 6.1) based on sensory channels used for carrying information. This classification is considered quite inadequate because of the use of a single criterion. For distance teaching-learning situations, the lower half of the audio, audio-visual and visual column could be used, and according to Romiszowski the media are used in a continuum from ‘self-presenting’ to ‘teacher-presented’.

Schramm (1973), on the other hand, classified media into two categories, viz. big media, and small media, based on cost and recent innovation. According to him, television, sound film, and computers are big media; transparencies, slides, etc. represent small media. Sparke (1988) without making any distinction between methods and media gives the following list:

- 1) **Face-to-Face**
 - a) Lecture
 - b) Classes (as in a school)
 - c) Small group discussion, usually for remedial purposes
 - d) Tutorials (i.e. a teacher with no more than 3 students)
 - e) Self-help groups (i.e. small groups without teacher)
- 2) **Printed Texts**
 - a) Text-books
 - b) Structured tutor-texts (as used in the Open University, UK)
- 3) **Films or TV Programmes**
 - a) Films for broadcasting
 - b) TV tapes
- 4) **Audio**
 - a) Audio broadcasting
 - b) Audio tapes
 - c) Audio-vision (i.e. audio tapes supported by printed illustration)
 - d) Telephone conferencing



Source: Romiszowski. (1974).

Fig. 6.1: A Classification of Instructional Media

- 5) **Audio-graphics** such as Cyclops (i.e. the recording on the audio tape of spoken commentary and of graphics or alphanumeric data for display on the TV screen).
- 6) **Computer-Aided Learning (CAL)**
- Using tele-type terminals
 - Using visual display units (e.g. tele-text)
 - Using the mail (for distance teaching) and a word-processor for preparing the communication from the computer.
- 7) **Laboratory or Practical Work**
- In-built teaching laboratories
 - Based on a practical apparatus for use in the home or at work
 - Projects.
- 8) **Assignments:** These can be associated with any of the above.

Laurillard (1993) gave one of the most comprehensive approaches to media taxonomy. According to her, all media could be categorised into four types: *discursive*, *adaptive*, *interactive* and *reflective*. She was concerned about the teaching functions of media, and based the classification of media on their level of interactivity, role in the learning process, and provision for dialogue between teacher and student. We shall explain briefly each of the four categories below:

- Discursive:** This category of media enable both teacher and student to agree on learning goals, make their conception accessible to each other, and give mutual feedback. Examples of discursive media are: audio-conferencing, video-conferencing, computer conferencing, and computer supported collaborative work through e-mail or mailing lists.
- Adaptive:** This media allow the teachers to alter the focus of the dialogue in the light of the emerging relationship between their own and the student's conception. Examples of adaptive media are: tutorial programmes, tutorial simulation, intelligent tutoring systems, etc.
- Interactive:** This media facilitate a student to act to achieve the task / goal and the teacher to provide feedback so that some change occurs as a result of student's action. Examples are: simulations, micro-worlds, and modeling.
- Reflective:** This category of media allow the teacher to help students link feedback on their action to the topic-goals at every level. Though no specific examples are given for reflective media by Laurillard, most of the media available could be considered reflective. But, normally pedagogical contents are not designed accordingly to be reflective in practice.

Apart from dividing media into different categories based on their pedagogic characteristics, Laurillard also describes print, audio-vision, audio cassettes, television, and video as other media forms.

Bates (1995) in his book *Technology, Open Learning and Distance Education* categorises media into two groups, viz. (i) one-way media, and (ii) two-way

media. The criteria are based on the feedback model of Pask (1975) that increases student learning. Bates has applied this to the available technologies in terms of their ability to facilitate feedback. He also developed criteria for decision-making called ACTIONS for use by distance teaching institutions to choose appropriate ‘media-mix’ for their organisations. Table 6.1 depicts the strengths and weaknesses of different media for distance teaching-learning.

Table 6.1: Relative Strengths of Various Media

Media	Access	Costs		Teaching		Interactivity		Organisation	Speed
		Student No. Large Small		Presentation Skills		Learning Social Material			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
One-way media									
Print	G	G	A	A	A	A	P	P	P
Radio	G	G	P	P	P	P	P	A	G
Audio Cassette	G	G	A	A	G	G	P	G	A
Educational Broad- cast TV	A	P	P	G	A	P	P	P	P
Video Cassette	G	A	P	G	G	G	P	A	P
Computer based learning	A	P	P	A	A	G	P	P	P
Multimedia	P	P	P	G	G	G	P	P	P
Two-way media									
Audio-conferencing	G	P	G	P	A	P	G	G	G
Live interactive TV	P	P	P	P	P	P	A	A	G
Video-Conferencing	P	P	A	P	A	A	A	A	G
CMC	A	A	G	P	G	A	G	G	G

Notes: G – Good; A – Average; P – Poor.

Source: Bates. (1995).

After having discussed a variety of media taxonomies, let us try to recapitulate and integrate these to develop a simpler form of classification for use in distance education. By now you might be aware that ‘interactivity’ is one of the most important factors in learning, and media which facilitate interactivity are considered more useful. Thus, we will take this as one criterion for our categorisation. The other criterion is a canonical one based on the sensory channel of Romiszowski. Table 6.2 depicts a simple classification of media.

Table 6.2: A Simple Classification of Media

Media	Non-Interactive	Interactive
Text and Graphic based (print-based)	Text-books	Self-instructional print material (partially interactive)
Audio-based	Audio cassette Radio broadcast	Telephone, audio conference audio-vision
Video-based	Television broadcast Video	Interactive television Video conference
Computer-based	Word-processing CD-ROM (textual delivery of materials), World Wide Web (partially interactive)	Integrated multi-media. Computer mediated communication. E-mail

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

1) a) Identify five one-way technologies and five two-way technologies used in distance education.

One-way

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Two-way

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b) What are the bases of categorisation of media according to Laurillard?

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c) Based on Taylor’s generations of distance education, in which model will you keep IGNOU for its media use and why?

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6.2.2 Print, Electronic and Educational Media: Merits and Demerits

Some of the important strengths and limitations of print, electronic (non-print) and educational media are presented below.

a) Strengths and Limitations of Print Medium

It is easy to transmit information through print medium and hence most commonly used in distance education. It is economical and has traditionally been used for pedagogical purposes.

Nevertheless, it demands skills of literacy as well as high levels of study skills. Some other limitations of print are:

- Lack of immediate teacher-learner and learner-learner interaction;
- Less scope for active learner participation;
- Longer wait period for feedback;
- Difficulty in providing individualised instruction; and
- Little use in providing psychomotor skill training.

b) Strengths and Limitations of Electronic Media

Though not all non-print media overcome all the limitations of the print medium, some of them do play a vital role in the teaching-learning process. Major strengths of non-print media include the following.

- i) They motivate learners psychologically by drawing their attention, arousing their curiosity, motivation and also by providing more appealing rationale.
- ii) Learners feel involved through the use of non-print media and thus, training in psychomotor skills could be provided comparatively easily.
- iii) Non-print media help to provide a learning atmosphere in which students actively participate in the learning process.
- iv) The recent developments in computer technologies facilitate catering to individual needs of learners.
- v) As most distance teaching institutions depend on print as a master medium, non-print media can supplement the master medium.
- vi) Non-print media are highly suitable for iconic and analogic representation of symbol system for knowledge dissemination.

c) Merits and Demerits of Various Educational Media

We present below, in tabular form, the merits and demerits of various educational media.

Table 6.3: Merits and Demerits of Various Educational Media

Medium	Merits	Demerits
Print	<ul style="list-style-type: none"> • Cheap • Easy to prepare • Applications in a variety of situations • No hardware needed for use. 	<ul style="list-style-type: none"> • Study skills required (from the students) • Time consuming.
Television	<ul style="list-style-type: none"> • Quite easy access • Mass coverage • Combines sound and visual presentation • Wide coverage of content and contexts, e.g. lecture, narration, demonstration, etc. • Can shift its focus from extensive to intensive. • High-tech appeal • Change in image-size possible 	<ul style="list-style-type: none"> • Script-writing and production costly as well as complex. • Needs costly hardware at user end as well as transmission end. • One-way flow of information. • Prior collaboration between concerned agencies essential • Fixed time schedule • Limited air-time.
Video tape and Film	<ul style="list-style-type: none"> • Information density high. • Wide application range. • Can be stopped and replayed • Allows focus shift-extensive to intensive • High-tech appeal • Combines audio and visual presentation • Re-usable, i.e. repeat possible • Permanent record and storage possible • Can be used whenever needed • Slow or fast presentation possible • Change in image size possible • Information density high • Lip sync in learning spoken language possible 	<ul style="list-style-type: none"> • Recording and presentation requires costly equipment • Technical and professional expertise required for production • Depends on power supply • One-way flow of information.

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Overhead Transparencies	<ul style="list-style-type: none"> • Helpful in systematic presentation of information: esp. in developmental sequences • Easy to use advanced level preparation • Presentation rate can be varied • Easy to prepare • Quite cheap • Useful for large groups. 	<ul style="list-style-type: none"> • Need OHP and electricity • Need complex skills for Presentation • Not easily portable
,Audio-tapes	<ul style="list-style-type: none"> • Easy to prepare • Re-usable • Applications in a variety of situations • Equipment and tapes easily portable • Duplication easy and cheap • Especially suitable for language teaching. 	<ul style="list-style-type: none"> • Tends to be over-used • Recording often faulty • Fixed rate of presentation of information.
Radio	<ul style="list-style-type: none"> • Easy access • Portable hardware • Relatively affordable because it is cheap • Mass coverage • Content can be edited for easy comprehension 	<ul style="list-style-type: none"> • Fixed time schedule • Depends on power-supply • One-way flow of information • Script-writing and production quite technical and need advanced skills • Costly capital hardware needed • Involves prior agreement for education use between educational institution and radio broadcast agency
Computer	<ul style="list-style-type: none"> • Present verbal, digital as well as graphic information • Can interact with learners by asking for answers to questions • Maintains a record of answers. • Can control other media hardware as well 	<ul style="list-style-type: none"> • Computer literacy including programming skills essential • Requires more capital input • Variety of software essential • Resolution of graphic images limited on a micro-computer system • Suitable for individual learners or small-size groups only

	<ul style="list-style-type: none"> • Individualises instruction in terms of learners' need(s) and pace • Can interface computer and video for learner-controlled programmes • Can simulate experiences and situations 	<ul style="list-style-type: none"> • Use of hardware and software across various systems is often difficult
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Source: IGNOU. (1995). *ES-318: Communication Technology for Distance Education*. New Delhi: IGNOU.

6.2.3 Relationship between Media, Technology and DE

Etymologically 'media' is the plural of 'medium', meaning 'a method of delivering information'. For most of us the commonly encountered medium is the book. Whereas, 'technology' is the science of delivering a medium. For example, broadcasting is a 'technology' used to deliver 'audio' or 'video' medium. Bates (1993b) refers media as "the generic form of communication associated with particular ways of representing knowledge, and elaborates that while certain technologies are closely associated with each medium, a variety of technologies may be used to deliver these media" (p.214). It can be derived from the relationship between media and technology, depicted in Table 6.4 that the distinction between these two terms will become less with the integration of media and technologies. For example, computing could well be argued by some as medium and by others as technology.

Table 6.4: Relationship between Media, Technology and DE

Media	Technologies	Distance Education Applications
Text	Print (including graphics)	Course units; supplementary materials; correspondence tutoring
	Computer	Database; electronic publishing
Audio	Cassettes; Radio; Telephone	Programmes; telephone tutoring; audio conference
Television	Broadcasting; Video Cassettes; Video Discs; Cable; Satellite; Fibre Optics; ITFS; Microwave; Video Conferencing	Programmes; lectures; video conferences
Computing	Computers; Telephone; Satellite; Fibre-optics; ISDN; CD-ROM; CD-I	Computer-aided learning (CAL; CBT); e-mail; computer conferences; audio graphics; databases; multimedia

Source: Bates. (1993b).

Nevertheless, Bates distinguishes technology from media through another dimension: some technologies are primarily *one-way* and the others are primarily

two-way (See Table 6.1). The two-way technologies allow interaction of various kinds: learner-tutor, learner-material, and learner-learner. Garrison (1989) too differentiates technology and media in a similar fashion. According to him, the ancillary media (which are basically one-way communication technology of Bates) are inadequate in themselves or unable to facilitate two-way communication in an educationally viable manner and, therefore, they cannot be classified as technologies.

6.2.4 Instructional and Delivery Technologies in DE

Idrus (1997) has categorised the instructional technologies used in distance education based on the use of delivery technologies, viz. postal-based, computer-based, and telecommunication-based. Table 6.5 depicts the categorisation given by Idrus.

Table 6.5: Instructional Technologies in DE

Tele-communication-based	Computer-based	Postal-based
<ul style="list-style-type: none"> • Radio or TV Broadcast • Internet • Audio Conferencing • Audio Graphics • Video Conferencing • Live Interactive TV • Computer Conferencing 	<ul style="list-style-type: none"> • Computer-aided instruction (CAI) • Computer assisted learning (CAL) • Computer based learning (CBL) • Interactive CAI 	<ul style="list-style-type: none"> • Print • Audio tapes • Slides • Film strips • Video tapes

Source: Idrus. (1997).

Chen (1997) presents the range of systems, media and delivery modes available for distance education. Table 6.6 illustrates five systems, viz. print, audio, graphics, video and computer. Each of these systems has different media. For example, Chen categorises three media for computer systems — computer assisted instruction; e-mail conferencing; Internet, www, etc.

Table 6.6: List of Distance Delivery Systems

System	Media	Delivery Mode
Print	Print Materials (programmed instruction, guided lessons)	Mail
Audio	Audio Cassette Radio Broadcast Audio Teleconferencing Telephones*	Mail Radio Transmission Operator-assisted Telephone lines*
Electronics Graphics	Electronic Board Fax	Telephone lines Telephone lines
Video	Instructional Television Fixed Services (ITFS)	Microwave

	Interactive TV; Video Conferencing	Microwave: cable; T-1 line; T-3 line, fibre optics, satellite
	Video tapes Video disc	Mail Mail
Computer	Computer-assisted Instruction E-mail Conferencing	Mail Telephone line; T-1 line; T-3 line, fibre optics
	Internet; WWW; Digital Video Conferencing	Telephone lines; T-1 lines T-3 lines; fibre optics

Note: * Not indicated in the original list

Source: Chen. (1997).

Mason (1998, p.19) while discussing media for delivering global education, elaborates the last category of Chen (i.e. Internet and www) into *three* kinds:

- *text-based systems*, including electronic mail, computer conferencing, real time chat system, MUDs / MOOs, fax and many uses of the World Wide Web;
- *audio-based systems* such as audio-conferencing and audio-graphics and audio on the web; and
- *video-based systems* such as video-conferencing, one-way and two-way video on the Internet with products like USee Me, Web-casting and other visual media such as video clips on the web.

6.2.5 Learning from Media: Pedagogical Utility

Having gone through categories of media and the merits and demerits of various media, it is now useful to make comparative analysis of these media use for distance education. But, for any comparison, we need certain criteria. Here, for the purpose of comparison we are concerned with pedagogic utility, and for that Taylor (1997) has outlined certain characteristics. These characteristics are flexibility in terms of time, place and pace; quality of materials; and interactivity. Based on these utility characteristics of delivery technologies to distance education, he (Taylor) depicts four models — *The Correspondence Model*, *The Multimedia model*, *The Tele-learning Model* and *The Flexible Model* — each representing one generation, i.e. four generations respectively. Later in 2001, Taylor added fifth generation model. All these five generations (models) along with details of the utility characteristics of each associated delivery technology are presented in Table 6.9 under sub-section 6.3.2 of section 6.3.

Chen (1997) on the other hand provides four important issues for consideration while analysing pedagogic utility of media. The issues are: interaction between learners and instructors, instructional strategies, motivation, and feedback / evaluation.

- **Interactivity:** While considering interactivity it is important to consider the type of communication between the teacher and learner. The communication could be one-way, two-way or multiple-way. For example, an audioconference could provide multiple-way interactivity.

- **Instructional Strategies:** It refers to teaching activity through which learners learn. There are a variety of instructional strategies such as lectures, group discussion, problems and case study, interviews, etc.
- **Motivation:** It is said that the motivation of distance learners is high, and therefore, the learning materials are more learner-controlled. The materials must sustain this motivation. Motivation could be designed into the materials through a variety of means, including good lay-out, spacing of the assignment deadline, regular contact programmes, etc.
- **Feedback / Evaluation:** Feedback is highly essential for student learning. The media should be capable of providing formative evaluation data to the learner for his / her overall learning.

A summary of the comparative pedagogic considerations of utility of various media based on Chen's criteria is given in Table 6.7.

Table 6.7: Pedagogical Considerations of Media

Systems	Teachers / Learners Interaction	Instructional Strategies	Motivation	Feedback / Evaluation
Print	One-way	Confined to mailing	Yes, depending on the design	Delayed
Audio Cassettes	One-way	Lecture; panel of experts; interviews	Limited	None
Radio Broadcast	One-way	Lecture; panel of experts; interviews	Limited	None
Audio Conferencing	Two-way multiple-way	Discussion; addressing a problem	Yes	Immediate
Electronic Board	Usually one-way; could be two-way if return equipment is available	Lecture; hands-on activities	Yes	Immediate, if return equipment is available
Fax	One-way	Limited to transmission of data	Limited	Delayed confined to print correspondence
ITFS	One-way	Lecture; panel of experts	Limited	None
Video Conferencing	Two-way Multiple-way	Approximates face-to-face lectures; panel of experts; discussion; interviews	Very strong	Immediate
Video Cassette	One-way	Lecture; tutorial	Limited	None

Interactive Video Disc	One-way	Lecture; tutorial; simulation	Limited	Confined to feedback programme
Computer-assisted Instruction	One-way	Tutorial; simulation	Yes	Delayed
E-mail Conferencing	Two-way; multiple-way	Online discussion and learning	Strong	Immediate; delayed, depending on the occurrence of the learning activities
Internet; WWW	Two-way; multiple-way	Online discussion; electronic researching; problem-solving activities.	Very strong	Immediate; delayed depending on the occurrence of the learning activities

Source: Chen. (1997).

In the following sub-sections, we will discuss the use of print-based, audio-based, video-based and computer-based media in distance education. Here, we are not focusing much on print-based media, as these are most widely used in distance education. Over the years a whole science of the use of layout, illustration and colour, advance organizers, guidelines, pre-tests, objectives, and questioning techniques has developed.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

2) a) What are the four criteria used by Chen to identify pedagogical utility of different media?

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b) Match medium in column ‘A’ with its merit in column ‘B’.

A	B
Print	Rich in meaning.
Television	Cheap
Video tape	Fixed schedule
Radio	Stop and repeat facility
Computer	Interactivity

c) What are the factors affecting successful learning from television?

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6.2.5.1 Print-based Media

Print-based media are very useful for distance education. Most part of the learning happens through books and other printed materials, either they are available in hard copies or soft copies.

The print-based media, which include books and many other materials, use text and pictures as their symbol system. Learning from books is a byproduct of relationship of this symbol system with human information processes. The symbol system used here is stable, which is read by the learner line by line to construct a text-base. They build mental models of the situation in the text-base, which is again matched with the information in long-term memory, if any. Learners comprehend text according to their own pace, subject to difficulty faced by them. They may even selectively study some portion of the text, use titles, summaries and overviews, and move back and forth between texts. Whenever pictures are available, they are used as supplement to the text. Since this process is more or less common, the designers can design the structure of print materials in distance education accordingly. The structure may include titles, explicitly stated behavioural objectives, questions in the text, signals, cohesive text elements, glossary of difficult terms, summary, etc.

6.2.5.2 Audio-based Media

The use of audio media in distance education institutions takes various forms. Mostly, it is used in the form of *broadcast radio*. Other forms are: *audio-cassettes*, *audio-vision*, and *telephone teaching*.

The advantages of radio are its almost complete *availability / accessibility* and its ability to reach isolated audiences quickly and at relatively low cost. However, the fixed schedules of broadcast creates problem for distance learners. The characteristics associated with broadcast technology such as scarcity of quality time, ephemeral nature of the programme, and continuous nature of the content are certain disadvantages of radio broadcast. Because of these, most distance teaching institutions use audio cassettes to supplement broadcast, by making available the content of the broadcast in a recorded cassette. The audio cassette allows the learner to use the material in his / her own place, time and pace. Since radio and audio cassette are devoid of interactivity, other developments have taken place, such as audio-vision, telephone teaching, and audio teleconference. In audio-vision, a set of visual (graphic) material is sent along with audio cassette to allow the learner to see the visuals along with listening the programme. Sometimes, the learners are asked to stop-read a visual diagram, do some activities and then continue listening. By doing this the essential component of learning-

interactivity is enforced in audio media. The telephone is mostly used as a supplementary teaching device, either to get information or to clarify doubts. Tutors are available on phone at the appropriate time to respond to learners' queries on one-to-one basis providing encouragement and academic inputs with a human touch. The audio-conference is an extension of telephone teaching, when a number of telephones can connect to a central telephone through a bridge. Teaching is done through this central telephone, and learners from the receiving end can discuss with their teacher simultaneously. The most important aspect of audio-teleconferencing is collaborative learning, i.e. learning from the experience of other learners by allowing the voice of one learner heard by all others connected to the bridge.

6.2.5.3 Video-based Media

The video-based media are distributed through mail, microwave communication, satellite communication and cable. Based on the medium of delivery, there are a wide range of media available in this category. Some of these are video-cassette, Television and videoconference. Television as a medium uses mostly the iconic and analogic symbol system and therefore, represents realism to a great extent. However, broadcast TV has the limitations similar to that of radio or being available at fixed time — continuous and ephemeral. In spite of these disadvantages, it is one of the most widely used media in distance education. The use of video cassette overcomes some of the problems of use of broadcast TV. As such the various formats available for use in video and broadcast TV make them highly suitable for teaching at a distance, where there is need to give demonstration and practical experience. Apart from working at the cognitive and psychomotor level, the rich visual medium allows the development of affective domain as well.

To make this high potential audio-visual medium interactive, another new system has developed with the integration of telecommunication into television. The system is called one-way video and two-way audio teleconference. This has been in use at the Indira Gandhi National Open University to deliver some of its course contents. Of course, later it has been also extended to selected downlinks to make it partly two-way video as well. The teleconference system has a set-up that includes a central studio from where teaching is done. The studio is linked up to a satellite and proceedings in the studio are relayed to receiving stations all over the country. The receiving stations with special dish-antenna capture the proceedings of the studio. The receiving centres are equipped with telephone having STD connections to interact with the studio in real-time mode. Apart from the advantages of television and video cassettes, this system allows feedback and interaction in real-time mode making it pedagogically useful for the learners. This teleconference facility could be delivered at the doorstep of the learner through cable TV networks and thereby allow home-based learning.

There are a few other emerging video-based media in distance education such as video disc, teletext and videotext, among others.

Multi-media

Video by itself has multiple media in it – print, audio, motion pictures, graphics, etc. Whenever we recommend the use of multiple media in teaching-learning (in conventional education or distance education situation), the immediate question

asked is – do media influence learning? One of the earliest researchers on the subject concluded that “media do not influence learning under any condition” (Clark, 1983). He further went on to say: “media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes change in our nutrition” (p.445). In contrast to this, a large body of research reported by Kozma (1991) and Bates (1993a) concludes that media have their specific role in learning. The present section is primarily based on the reporting of these two experts in media research. Kozma used a framework of learning where a learner actively collaborates with the medium to construct knowledge.

Most dynamic video medium is Television. Let us discuss how it can be used effectively for promoting learning.

Learning from Television

Television uses iconic and analogic symbol system to represent knowledge. Research on television viewing indicates that the viewers are normally at a low level of engagement. However, for learners viewing a programme with a purpose, it is a more serious exercise including thoughtful involvement, constructing more detailed, elaborate representation and drawing more inferences from them. Learning from television is enhanced, if the following conditions are met.

- *Delivery:* The student must have easy access to watching the programme. This means the transmission time must be suitable to the learner. Moreover, increasing repeat telecast of the programme will also facilitate access.
- *Prior experience of learning from television:* Learners mostly use television for the purpose of entertainment. Since it is different from educational television, students with some experience do better. This means the 3rd year student in a degree course could benefit more from television programme than a fresher. It also calls for teaching the learners how to learn from television.
- *Student control over media:* Broadcast television does not provide control facility to the learners, whereas video cassettes do. The control characteristics allow the learners to use a programme again and again, stop, think, reflect and analyse issues discussed in the programme.
- *Relevance:* The learner’s perception of relevance of the programme also affects learning from it. This is highly subjective in nature. But, if the instructional designer puts the subject matter in a relevant way along with relevant facts, it is definitely going to help the learners. Sometimes, the supplementary character of television programmes also affects additional learning from it. If the learners think assessment is not going to cover television viewing, then, it is not relevant. Therefore, telling learners what is relevant is very important.
- *Media Notes:* This is one of the key factors affecting learning from television. The design of media note should be such that it arouses interest, gives main points of the programme, indicates what are to be considered with higher emphasis, and what outcome is expected. The media note can also include the relevance of the programme.

6.2.5.4 Computer-based Media

The emergence of microcomputer has heralded a new era in the use of computers in education. Microcomputers allow users to process information locally with the potentiality to even connect to remote computers through networks. Microcomputers can be used for word processing, maintaining a database, desktop publishing, running computer-assisted learning packages, sending communication through e-mail, etc. From the view point of educational use of computer media, the other related developments are availability of Graphical User Interface (user friendly screens), higher storage capacity (CD ROMs), network ability of computers (Computer Mediated Communication) and the Internet. Computers are used in education for specific pedagogic purposes, some of which may relate to:

- increasing the learner motivation;
- helping recall previous learning;
- providing new instructional stimuli;
- activating the learner's response;
- providing systematic and steady feedback;
- facilitating appropriate practice;
- sequencing learning appropriately; and
- providing viable source of information for enhanced learning.

In distance education, the computer is being considered a more open and flexible delivery media that can be adapted to varying individual needs in terms of time, place, pace and choice of content. The computer-based media in distance education are primarily available in three modes — *Independent*, *Interactive* and *Communication*. In the independent mode, it is the Computer and its various facilities that are put to use by the learner to use a word-processing software, to compute data using a spreadsheet or to develop a database. In a way the learner works on a computer system. Whereas in the interactive mode, the learner makes use of a pre-programmed learning package (e.g. Computer-Aided Instruction, Computer managed learning) to learn the skills, concepts and processes. The learning package provides opportunity for interaction and feedback for enhanced learning. The third role is communication, where the learner communicates with another learner or teacher using the computer to learn cooperatively. The different types of media available in all these modes are:

- Computer-based learning packages;
- CD-based multimedia packages;
- E-mail for computer-mediated communication; and
- The Internet and World Wide Web.

The development of WWW and its multimedia interactive capability have taken distance education towards virtual reality. As such, there are virtual universities on the Internet that deliver courses through WWW. It is because of these potentialities of computer media, the 4th generation of distance education identified by Taylor (1995) is termed as flexible learning model.

Check Your Progress

- Notes:** a) Space given below the question is for writing your answer.
b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.
- 3) Identify the following statements as True or False.
- a) It is difficult to reach a large number of people through radio (T/F)
 - b) Audio cassette gives learner the flexibility of time, space and pace (T/F)
 - c) Telephone is mostly used as a supplementary teaching device (T/F)
 - d) Video-based media are distributed only through satellite. (T/F)
 - e) Television also allows the development of affective domain. (T/F)
 - f) The use of computer enables cooperative learning. (T/F)

6.3 TECHNOLOGICAL APPLICATIONS IN ODE

As we have discussed above, different types of technologies are used in ODE keeping in view their nature, cost, availability, range of their applications, accessibility, extent of use, and effectiveness, among other things, in varied contexts and purposes of education. Let us discuss the applications of the technologies in ODE in greater details.

6.3.1 Applications of One-way and Two-way Technologies

We have already known about the differences between the technology and the media. In this sub-section we look at the technological applications that enhance the use of media in distance education. The applications of both one-way and two-way technologies are summed up in Table 6.8, to present a broader view of the same.

Table 6.8: One-way and Two-way Technologies

Media	One-way Technology Applications	Two-way Technology Applications
Text	Course units; supplementary materials	Correspondence tutoring
Audio	Cassette programmes; radio programmes	Telephone tutoring; audio conferencing
Television	Broadcast Programmes; Cassette Programmes	Interactive television (TV out: telephone in); video conferencing
Computing	CAL, CAI, CBI, databases; Multi-media.	E-mail; interactive databases; Computer conferencing

Source: Bates. (1993b).

Let us discuss some of the important applications that are more interactive and popularly used in distance education.

i) Interactive Radio Counselling (IRC)

Radio technology popularly came into use as one-way technology, but by combined use of it along with other technologies it can serve as an effective tool for interaction with the learners. Though Radio is not new generation technology it can be transformed into an effective tool for interaction in open and distance learning. However, it is possible only through systematic planning, designing, implementation and monitoring. For example in India, Interactive Radio Counselling is a recent concept in distance learning. Live counselling is provided on radio by invited experts. Students can ask questions right from their homes on telephone. These sessions are conducted for an hour on selected days from different radio stations in the country. A toll free telephone numbers are also provided for this purpose from selected cities.

ii) Teleconferencing (TC) and Videoconferencing VC)

A *teleconference* or *teleseminar* or *videoconference* is the live exchange and mass articulation of information among several persons and machines remote from one another but linked by a telecommunications system. Terms such as audio conferencing and telephone (phone) conferencing are also sometimes used to refer to teleconferencing. The telecommunications system may support the teleconference by providing one or more of the following: audio, video, and/or data services by one or more means such as telephone, computer, telegraph, teletypewriter, radio and television. (<https://en.wikipedia.org/wiki/Teleconference>).

Internet teleconferencing includes internet telephone conferencing, video conferencing, web conferencing, and augmented reality conferencing. Internet telephony involves conducting a teleconference over the Internet or a Wide Area Network. One key technology in this area is Voice Over Internet Protocol (VOIP). Popular software for personal use includes Skype, Google Talk, Windows Live Messenger and Yahoo! Messenger (*Ibid*).

Videoconferencing (VC) is the conduct of a videoconference (also known as a video conference or video teleconference) by a set of telecommunication technologies which allow two or more locations to communicate by simultaneous two-way video and audio transmissions.

At IGNOU, two-way audio and one-way video live teleconferencing sessions have been initiated in 1990s, which are conducted via satellite through interactive Gyan Darshan Channel from the University studios at its Electronic Media Production Centre (EMPC) as per the schedule made available at the Regional and Study Centres. The learners will have to go to the nearest reception centre at the scheduled time for taking the benefit of this facility. Occasionally and recently it has been using two-way video conferencing and computer-based internet conferencing as well.

Check Your Progress

- Notes:** a) Space given below the question is for writing your answer.
b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

4) a) Describe the role of media in distance education in about 4 lines.

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b) Listed below are a few media and technologies in distance education. Identify them as M for medium, and T for technology.

Text	<input type="text"/>	Computer	<input type="text"/>
Print	<input type="text"/>	Telephone	<input type="text"/>
E-mail	<input type="text"/>	Cassettes	<input type="text"/>
Audio	<input type="text"/>	Broadcast	<input type="text"/>

6.3.2 Generations of Distance Education

The use of media in distance teaching institutions has led to the evolutionary thinking on the development of distance education. Some scholars classify distance education into different generations based on the complexities of ‘media-mix’ used in teaching-learning. The very first such effort was that of Garrison (1985) who categorised the ‘two-way communication’ media / technologies into three generations — correspondence, teleconferencing, and computers. In addition to the three generations, Garrison created another ‘ancillary media’ category that included one-way communication media (Fig. 6.2).

DISTANCE EDUCATION TECHNOLOGIES
 (Two-way communication)

- 1) Correspondence (First Generation)
 Message: Print
 Delivery Mode: Mail
- 2) Teleconferencing (Second Generation)
 Message: Audio / Video
 Delivery Mode: Telecommunication
- 3) Microprocessor Based (Third Generation)

ANCILLARY MEDIA
 (One-way communication)

- 1) Print Materials
- 2) Audio /Video Cassettes
- 3) Audiographics*

- Fascimile
- Slow-scan TV
- Compressed Video
- Tele-writing
- Videotext
- 4) Laser Video disc
- 5. Broadcast
 - Radio
 - Television

Note: * May support two-way communication

Source: Garrison (1989).

Fig. 6.2: Garrison's Taxonomy of Media

Garrison's generation of distance education has been further modified and illustrated by Nipper (1989), Bates (1991) and Taylor (1995). Taylor's generations given in Fig. 6.3 are comprehensive and encompass even those illustrated by Nipper and Bates.

- First Generation — The Correspondence Model
- Print
- Second Generation — The Multimedia Model
- Print
 - Audio tape
 - Video tape
 - Computer-based learning (e.g. CML / CAL)
 - Interactive video (disk and tape)
- Third Generation — The Tele-learning Model
- Audio teleconferencing
 - Video conferencing
 - Audiographic communication
 - Broadcast TV / Radio
- Fourth Generation — The Flexible Learning Model
- Interactive multimedia (IMM)
 - Internet-based access to WWW resources
 - Computer mediated communication

Source: Taylor (1995).

Fig. 6.3: Taylor's Four Generations of Distance Education

Later, Taylor (2001) improved it to include one more generation. For detail of all the five generations, along with details of the utility characteristics of each of associated delivery technologies, see Table 6.9.

Table 6.9: Models of Distance Education: A Conceptual Framework

Models of Distance Education and Associated Delivery Technologies	Characteristics of Delivery Technologies					
	Flexibility			Highly Refined Materials	Advanced Interactive Delivery	Institutional Variable Costs Approaching Zero
	Time	Place	Pace			
FIRST GENERATION: The Correspondence Model						
Print	Yes	Yes	Yes	Yes	No	No
SECOND GENERATION: The Multimedia Model						
Print	Yes	Yes	Yes	Yes	No	No
Audio tape	Yes	Yes	Yes	Yes	No	No
Video tape	Yes	Yes	Yes	Yes	No	No
Computer-based learning (e.g. CML/CAL/IMM)	Yes	Yes	Yes	Yes	Yes	No
Interactive video (disc and tape)	Yes	Yes	Yes	Yes	Yes	No
THIRD GENERATION: The Telelearning Model						
Audio teleconferencing	No	No	No	No	Yes	No
Video teleconferencing	No	No	No	No	Yes	No
Audio graphic communication	No	No	No	Yes	Yes	No
Broadcast TV/Radio and audio teleconferencing	No	No	No	Yes	Yes	No
FOURTH GENERATION: The Flexible Learning Model						
Interactive multimedia (IMM) online	Yes	Yes	Yes	Yes	Yes	Yes
Internet-based access to WWW resources	Yes	Yes	Yes	Yes	Yes	Yes
Computer mediated communication	Yes	Yes	Yes	No	Yes	No
FIFTH GENERATION: The Intelligent Flexible Learning Model						
Interactive multimedia (IMM) online	Yes	Yes	Yes	Yes	Yes	Yes
Internet-based access to WWW resources	Yes	Yes	Yes	Yes	Yes	Yes
Computer-mediated communication, using automated response systems	Yes	Yes	Yes	Yes	Yes	Yes
Campus portal access to institutional processes and resources	Yes	Yes	Yes	Yes	Yes	Yes

Source: Taylor (2001) (<http://www.c3l.uni-oldenburg.de/cde/media/readings/taylor01.pdf>).

6.3.3 Technology-enhanced Learning

Application of advanced technologies in ODE has made its access wide-open and ubiquitous in its reach. Given below are some important current developments in the field of ODE.

6.3.3.1 Open Educational Resources (OER)

A radically new approach for providing knowledge is through Open Educational Resources (OERs). The MIT Open Course Ware project is credited for the germination of the Open Educational Resources Movement in 2002 by putting MIT's entire course catalogue online. The term OER was first adopted at UNESCO 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries. The forum defined OER as "the provision of educational resources, enabled by information and communication technologies, for consultation, use and adaption by a community of users for non-commercial purposes" (UNESCO, 2002). Thereafter, there has been no looking back on it.

OER movement was started to speed up the development of new learning resources, stimulate internal improvement, innovation and reuse and help the institutions to keep good records of materials and their internal and external use. Educational institutions should leverage taxpayers' money by allowing free sharing and reuse of resources developed by funded institutions. The review of the OER literature shows that there are three types of open resources:

- 1) **Open Source (OS):** Open source refers to both the concept and practice of making program source code openly available. Users and developers have access to the core designing functionalities that enable them to modify or add features to the source code and redistribute it. Extensive collaboration and circulation are central to the open source movement (Lakhan & Jhunjhunwala, 2008). Open source applications in the educational context can be categorized as knowledge ware and courseware. On the knowledge ware front, LMS and CMS applications like Moodle, ATutor, etc. are becoming very popular and many ODL systems are adopting them. On the courseware front, the concept of open access is gradually gaining ground. It is gradually being felt that to facilitate and nurture flexible learning communities, education system needs to draw on the collective intellectual capital and wisdom (of educators). Based on this premise, many innovative projects like MIT's Open Course Ware or the MERLOT projects were initiated.
 - **Open source learning management system (Open knowledge ware):** Another aspect of the impact of the open source movement on education is the rapid proliferation of open source learning management system (LMS) tools and other learning applications. LMS manages, primarily, the delivery of self-paced online (e-learning) academic programs. Flexibility in qualification, in duration for completing the course, and in age bar are some parameters which provide good opportunity for knowledge enhancement. Hence LMS for ODL has to address all such requirements intelligently managing both learners and learning. Moodle is an open source LMS tool. Moodle integrates pedagogical features missing in many LMS tools, allowing instructors to construct customizable, online courses or a wide range of course modules on a

flexible platform. Moodle can be downloaded to any computer and used to support a single instructor site or a system of thousands of students. It is licensed by the Open Source Initiative under a general public license (GPL) Students contribute in their own learning using a Moodle. The features of Moodle are such that students actively participate in Moodle (Lakhan & Jhunjhunwala, 2008).

- **Open Course Ware (OC119: OCW):** It is a free and open digital publication of high quality university level educational materials. These materials are organized as courses, and often include course planning materials and evaluation tools as well as thematic content. Open Course Ware are free and openly licensed, accessible to anyone, anytime via the Internet — MIT Open Course Ware, Kyoto-University Open Course Ware, Tokyo Tech Open Course Ware, Utah State University Open Course Ware. Many ODL institutions are also developing their own digital repositories of learning objects and resources. IGNOU has developed national digital repository eGyanKosh as an open resource even with facility of video streaming of its video programmes. It is being hyperlinked to the Sakshat portal of WIRD, Government of India.
- 2) **Open access concerned with journal articles:** Readers can retrieve articles without financial or access barriers. No fees, registration, or membership is required. The research community has long recognized the opportunity that immediate, barrier-free, online access presents to researchers to world faster by enabling them to get to research articles and incorporate new findings into their research more rapidly.
 - 3) **Open Educational Resource (OER):** Use of OERs by the teachers of the ODL institutions can help them in saving their time. This time can be used by teachers for engaging with the learners and helping them to complete their courses. It is also cost effective to use already existing materials and reduce the developmental time of courses. Usually course development in open universities takes 12-18 months and this can be significantly reduced.

The teachers in ODL institutions can also be encouraged to contribute to OER movement by developing OER materials: The access to good quality OERs is the first step to improving access to quality learning. But availability of these materials is not sufficient to render OER usable in all contexts. Education is always contextual and therefore, OERs will require adaptation to make these relevant to the target group. Institutions need to create conducive environment for the use of OERs.

Use of OERs: As mentioned in this unit, OERs can be used extensively by the ODE institutions. ODE teachers can save their time by using them and they can instead use this time for engaging with the learners and helping them to complete their courses. It is also cost-effective to use already existing materials and reduce the developmental time of courses. ODE teachers can also be initiated into creation and development of good quality OERs in different languages. The users can further adapt them as per their needs. But teachers may not put in needed time and energy in the development of quality OER materials. Therefore, proper reward systems need to be put into place for encouraging them. Another important issue here is integration of OERs in teaching-learning process and certifying students based on learning from OERs. Another important consideration is support and guidance needed by learners to study from media enabled OER materials.

6.3.3.2 Massive Open Online Courses (MOOCs)

Due to emergence of MOOCs, connectivism and its principles now find a testing ground. Connectivism defines learning as a continual process which occurs in different settings including communities of practice, personal networks and work place task. Ability to see connections between fields, ideas and concepts is a core skill. This proposed online learning environment would incorporate any number of students, content sources, and content delivery options (real and virtual), limited only by the capacity of the technologies and associated costs (Siemens and Downes, 2008). The components of a MOOC system include any combination and permutation of teachers, students, information (topic and related content), and context. The first MOOC class, in 2008, consisted of 2,300 students, and was sponsored through Manitoba University, Alberta, Canada. As per MOOCs, the paradigm of tightly controlled learning processes needed to be re-evaluated in a manner that opened up learning networks, allowing students to customize their learning experiences within a loosely designed framework. This framework looked at information resources as content clusters that surrounded a topic, from which students could sample content while adding to and discarding from it according to their own needs and goals. (Ibid).

Concept and features

The concept of MOOCs can be understood by its following features:

- **Open access:** A MOOC participant does not have to be a registered learner in an educational institution to take a MOOC, and are not required to pay a fee. Participant gets access by logging in and signing up.
- **Scalability:** It means the ability of a system, network, or process to handle a growing amount of work in a capable manner or its ability to be enlarged to accommodate that growth. Many conventional courses depend upon a small ratio of students to teacher, but the word ‘massive’ in MOOC suggests that the course is designed to support an indefinite number of learners.

MOOCs can be included in the ODL system for mainstreaming non-conventional groups in education (low income, employed). MOOCs can make ODL system more efficient by providing high quality education at lower costs. If more institutions participate and collaborate with ODL institutions then choices of courses for learners will broaden. These collaborating educational institutions can accept each other’s’ courses and credits. However, though openness may be taken as equivalent to free, it will still demand a lot of effort (and costs) to develop good quality ODL.

Types

Currently, the MOOC concept is so new that there has been little agreement as to what actually constitutes a MOOC and what educational or other objectives they can and should address. The vast majority of existing MOOCs are xMOOCs. The structure and pedagogical philosophy of the open online courses offered at Stanford University in 2011 were quite different from the connectivist MOOCs (cMOOCs). To differentiate between the two educational approaches, the terms “cMOOC” and “xMOOC” were coined, “c” denoting the focus on connectivism and “x” denoting “exponential,” to describe the massive participation, or denoting “extension,” for example, HarvardX as an extension of the Harvard campus, and MITx as an extension of MIT (Downes, 2008).

- **xMOOCs:** Most of the MOOCs created at present are xMOOCs. xMOOCs are generally delivered via third party platform providers such as Coursera, edX, and Udacity. Most are “cohort-based” in that they are offered over a fixed period of time, with participants being expected to complete activities within set windows of time. These courses and their associated materials often become unavailable for non-registered participants not long after their conclusion. Some xMOOCs are self-paced, remaining open indefinitely to participants (Hollands, and Tirthali, 2014).
- **cMOOCs:** Connectivist MOOCs (cMOOCs) are characterized by a more fluid structure that addresses an overarching instructional goal or question but is less directive with respect to process. Siemens describes the cMOOC experience as the exploration of a topic area and creation of artifacts in an “atelier” environment. Instructors may pose initial or weekly questions and challenges, and provide a variety of text-based or media resources. The success of the cMOOC is highly dependent on participant interaction, for example, via discussion forums, Diigo groups, or Twitter. Course outcomes are often unique products, such as blog posts, images, diagrams, or videos generated by participants using a variety of social media. The role of the instructor is to act as a facilitator by aggregating, reviewing, summarizing and reflecting on participant activity in a daily or weekly newsletter. cMOOCs are usually delivered using easily available course delivery platforms, such as Blackboard Collaborate, enhanced with collaboration tools. The question for MOOCs over the longer term is whether variable costs can be contained by automating functions and substituting instructional support provided by expensive faculty members with less costly teaching assistants, part-time instructors, or peer-to-peer learning and assessment. Many MOOC developers anticipate that the costs of re-running a MOOC will be substantially lower than the costs of initial development (*Ibid*).

Prospects

Hollands, and Tirthali (2014) identified six major goals for MOOC initiatives: i) Extending the reach of the institution and access to education; ii) Building and maintaining brand, iii) Improving economics by lowering costs or increasing revenues; iv) Improving educational outcomes for both MOOC participants and on-campus students; v) Innovation in teaching and learning; and vi) Conducting research on teaching and learning. They found that many colleges and universities have adopted several different stances towards engaging with MOOCs and are using them as vehicles to pursue multiple goals mentioned above. They termed those institutions actively developing MOOCs as “producers”, those using MOOCs developed by other institutions in their programs as “consumers”. While there are a few institutions doing both, others are adopting a “wait-and-see” approach, or have considered MOOCs and have decided against any form of official engagement. There is no doubt, however, that the advent of MOOCs has precipitated many institutions to consider or revisit their strategy with respect to online learning, whether at large scale or small.

Scope of OERs and MOOCs in ODL System

The idea behind the concept of OER is to promote access to education to a wider audience, especially those from deprived regions of the world, where the open resources can be freely reused, improved and repurposed to fit into different

contexts. Currently most OERs are generated by educational organizations, usually Universities, using new or existing grant funding to do so (Lane, 2008). The philosophy of OER conceives of educational materials as common public goods from which all should benefit, but especially those who receive the least benefit and support from current systems of education, whether publically or privately funded. This view is supported by the idea that knowledge itself is a collective social product, one that naturally forms a common pool that needs to be accessible to all. The view is strongly aligned with the financial reality of educational funding, since the vast majority of educational materials are funded in diverse ways, directly or indirectly, but the view is not aligned with the reality of the materials distribution, which is frequently non-public, closed, and tightly controlled (Rossini, 2010).

6.3.3.3 M-Learning

M-learning or mobile learning is a subset of eLearning whereas e-Learning is a subset of distance education. M-Learning addresses the learning needs of those learners who are always on the move. Landline telephones and wired computers are beginning to be replaced by wireless technologies (Santosh Kumar, 2013).

The move to offer more mobility and access to education is now occurring at a speed that was difficult to predict just a year or two ago. Increased use of mobile telephones and their convergence with Personal Digital Assistants (PDAs) and similar devices has created new possibilities for providing learning and the development of education on the go that offers just-in-time learning moments in synchronous mode. The strength of the mobile phone is that it is the tool par excellence for social connectivity. If students are truly able to study anywhere, anytime, while actively moving around, for example, waiting for or sitting on the bus or doing housework, simultaneously receiving and providing information, and interacting wherever they may be, educational and social communications are inextricably intertwined.

Learners can be presented with advanced organizers. As mentioned in Unit-5, an advance organizer is information that is presented prior to learning and that can be used by the learner to organize and interpret new incoming information. To facilitate constructivist learning, the posting of, for example, an abstract of a new text or new chapter so that learners are aware of the overview of the text or of a list of concepts is valuable. Furthermore, learner support systems such as instant connectivity with teachers, and peers, and learning management systems (LMS) that give information on assignment submission dates, examination results, changes of meeting times and locations, and similar short information blogs can efficiently be transmitted through SMS. Theoretically, when appropriately designed and well managed, m-learning can improve pedagogy by timely learner support systems that provide an extra communications channel for learners and teachers, and between and among learners.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

5) What is open source? How do you categorise the applications of open source?

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6.4 LET US SUM UP

In this unit we have discussed the taxonomies of media as proposed by Romiszowski, Sparkes, Laurillard, Bates, Idrus and Chen. In reference to the taxonomies, the propositions by Garrison, Nipper, Bates and Taylor on media use in distance education vis-a-vis the generations of distance education have also been discussed. Based on all the above taxonomies and propositions, we have provided a simple classification of media as: text and graphic-based, audio-based, video-based and computer-based media. Each of these categories has also been discussed in detail. We have also discussed the merits and demerits of various media, including their pedagogical utility based on the criteria of interactivity, instructional strategies, motivation and feedback / evaluation.

The terms ‘media’ and ‘technology’ as found in the literature is very often interchangeable. However, we made a distinction between these terms based on Bates’s one-way and two-way technology approach, among others. However, these distinctions will be blurred in the days to come with the development of more integrated media like the computer and mobile phone. The development of distance education itself is due to the emergence of different media. Different media use different symbol systems to represent knowledge. The Symbol system could be digital, iconic, analogic or a mix of more than one of these three. A judicious use of ‘media-mix’ could increase student motivation, supplement the main medium, and enable the learner control over his / her learning. We also discussed some of the strengths of non-print media in motivating, involving, activating the learners, improving the learning atmosphere and acting as supplementary media to the master medium — print. Some media provide opportunity for better interaction at a distance, which is essential for effective learning.

In the last section, we have highlighted how the teaching-learning methodology is changing with the adoption of new technologies and demonstrated possible paradigm shift in the ODL system that is rooted in the shift from mass production economy to an information technology-based economy. In this background, the new ICT supported emerging pedagogical models such as OER and MOOCs have been identified and briefly discussed with a view to highlight the scope of OERs and MOOCs and their impact on the ODL system. In this context we have also touched upon the role that M-learning or mobile learning can play as a subset of eLearning, which plays its role as a subset of ODL.

6.5 ANSWERS TO 'CHECK YOUR PROGRESS' QUESTIONS

- 1) a) **One-way Technologies**
Textbooks
Audio cassettes
Broadcast TV
Radio
Stand alone multimedia
- Two-way Technologies**
Self-instructional materials
Audio conferencing
Interactive TV
Telephone tutoring
E-mail
- b) Laurillard categorised media into different types based on their level of interactivity, role in the learning process and provision for dialogue between teacher and student. The types of media are: discursive, adaptive, interactive and reflective.
- c) The Indira Gandhi National Open University uses multimedia approach to distance education. But, in fact, it could be said to be an institution in all the generations. The reasons are:
- It makes large use of print medium. Some programmes don't have audio-video programmes.
 - It is now using teleconference widely for teaching. Broadcast TV and Radio is also a common component of teaching.
 - Recently it has started using Internet for delivery of computer programmes and uses computer mediated communication as well.
- 2) a) The four criteria used by Chen to identify pedagogical utility of media are: interactivity, instructional strategies, motivation and feedback / evaluation.
- b) **Column A**
Print
Television
Videotape
Radio
Computer
- Column B**
Cheap
Rich in meaning
Stop and repeat facility
Fixed Schedule
Interactivity
- c) Factors affecting successful learning from television include: delivery, prior experience of learning from television, student control over media, perceived relevance, and media notes.
- 3) a) F; b) T; c) T; d) F; e) T; f) T
- 4) a) Distance education developed primarily because of the emergence of printed media. Media plays the role of teachers in distance education. Media create an environment for learning, comparable with that in conventional system, through the use of symbol systems — digital, iconic and analogic — which also provide for the much needed interactivity for learning.
- b) Text – M Computer – M
Print – T Telephone – T
E-mail – T Cassette – T
Audio – M Broadcast – T

- 5) Open source refers to both the concept and practice of making program source code openly available. Users and developers have access to the core designing functionalities that enable them to modify or add features to the source code and redistribute it. Open source applications in the educational context can be categorized as knowledge ware and courseware. On the knowledge ware front, LMS and CMS applications like Moodle, ATutor, etc. are becoming very popular and many ODL systems are adopting them. On the courseware front, the concept of open access is gradually gaining ground. It is gradually being felt that to facilitate and nurture flexible learning communities, education system needs to draw on the collective intellectual capital and wisdom (of educators). Examples of this courseware include the projects like MIT's Open Course Ware or the MERLOT.

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Suggested Readings

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6.7 UNIT END EXERCISES

Unit End Questions

You may write brief notes or full-length answers to these questions in your own interest. It might help you during your preparation for examination.

- 1) Discuss different classifications of media (1000 words).
- 2) What are the merits and demerits of print, electronic and educational media? (500 words).
- 3) Explain the pedagogical utility of print, audio, video and computer based media. (1000 words).
- 4) What are one-way and two-way technologies? Explain their applications in distance education. (500 words).
- 5) What do you understand by technology-enhanced learning? Explain, with examples, the recent trends in this regard. (1000 words).



Questions for Critical Reflection

- 1) Although there are five generational models of distance education, which of these models, in your opinion, are more pervasive and truly massive? Give reasons.
- 2) Do you think MOOCs can be equally effective in all countries of the globe at time in future? Justify your answer by comparing the concept with global realities.

UNIT 7 DEVELOPMENT OF SELF-LEARNING PRINT MATERIALS

Structure

- 7.0 Introduction
- 7.1 Objectives
- 7.2 SLPMs: What and Why?
 - 7.2.1 Concept
 - 7.2.2 Need
- 7.3 Components of SLPMs
 - 7.3.1 Active Learning Components
 - 7.3.2 Access Devices
- 7.4 Pre-requisites for Course Writers / Instructional Designers
- 7.5 Preparation of an SLPM Unit
 - 7.5.1 Arranging Topics (Concept Mapping)
 - 7.5.2 Preparing Unit Structure
 - 7.5.3 Writing the Unit
- 7.6 Editing of the Unit
 - 7.6.1 Format Editing
 - 7.6.2 Content Editing
 - 7.6.3 Language Editing
 - 7.6.4 Copy Editing
- 7.7 Let Us Sum Up
- 7.8 Answers to 'Check Your Progress' Questions
- 7.9 References
- 7.10 Unit End Exercises

7.0 INTRODUCTION

We are aware that the success and the effectiveness of ODE systems largely depend on the quality of learning materials in print. Writing for distance learners is a more challenging task than writing a book or writing for a journal. The main objective of SLPMs is to stimulate, facilitate and sustain independent learning by the student. In other words, SLPMs create an environment whereby the student gets motivated and interested to learn independently. SLPMs perform the functions of an effective, efficient and inspiring teacher in the distance learning situation.

In Unit-5, you studied about different aspects of designing SLMs in general and the principles, key features and process of designing SLPMs in particular. And, in Unit-6, you have got clear understanding of the role, place and significance of different media and technology in ODE. In the present Unit, we shall deal with the concept, components and practical aspects involved in development of self-instructional print materials (SLPMs).

7.1 OBJECTIVES

After thorough reading of this unit, you should be able to:

- explain the concept and need of self-instructional print materials;
- describe the components of SLPMs;
- identify the pre-requisites for course writers / designers;
- explain the process of writing a self-learning unit;
- analyse the tasks, functions and concerns of distance education editors involved in different types of editing; and
- appreciate the factors that influence the quality of editing, and thus, the quality of distance learning materials vis-a-vis the learning needs of distance learners.

7.2 SLPMS: WHAT AND WHY?

The primary goal of distance education materials is to help the student learn independently at his own pace and convenience. In other words, the SLPMs should promote the concept of self-learning. The SLPMs should therefore be based on the theory and principles of self-learning, which we have already discussed in Unit-5. Before we go into the practical aspects of development of SLPMs, let us discuss, in brief, the concept and need of SLPMs in distance education below.

7.2.1 Concept

We know that, in the distance education system the learners mostly study at a distance; from their home or the workplace or any other place of their convenience. They do not get opportunity to interact with either the open learning institution or the teacher or the fellow learners frequently. Their learning material should, therefore, be designed in such a way that the functions of an effective teacher are built into it. In other words, the distance teacher in the learning material performs the functions of a classroom teacher such as directing the students, motivating them, explaining the concepts, asking questions, assessing them, etc., which we have discussed in Unit-5 (See section 5.6). These functions facilitate independent learning popularly known as autonomous learning or self-learning among the distance learners without much external support.

In Unit-5 we studied that SLMs/SLPMs are based on the various theories of learning and communication have had great impact on the design and preparation of SLMs/SLPMs. The broad principles of programmed instructions such as division of content into small (but manageable) steps, logical and sequential ordering, feedback on performance, try-out (or developmental testing), etc., act as the guiding factors in designing and development of SLPMs.

SLPMs therefore are different from a textbook or a journal. Unlike an article or a book, the SLPMs do not aim at scholarly presentation. SLPMs are developed in self-instructional or self-learning format to promote effective self-learning. Only effective SLPMs can arouse and sustain interest in the learners for self-learning. Thus, SLPMs are specially designed to provide well planned instruction

to the identified target groups with the purpose of promoting self-learning and thus enable them acquire intended knowledge, attitudes and skills.

7.2.2 Need

Since the distance learner is away from the distance education institution, neither the teacher nor the peer group is around to help him in his learning from the materials. Given the situation, the students look for such learning materials which are best suited to their needs and requirements. The load and style of presentation of content should also fit into the learning habits, prior knowledge, language competency, etc., of the learners hailing from diverse backgrounds.

In a system where neither teacher is present to answer a student's query or explain/clarify a point or correct the student, nor he can seek help or assistance from his fellow learner, it is essential to provide materials that fulfill the above needs and requirements of learners with a view to guiding the student at every step of his learning. Therefore, SLPs are to be designed and developed along sound principles of pedagogy and andragogy. Therefore, in order to address the problems associated with distance of the institution, the teacher and the peer group from the learner, the learning materials should be such that they are self-contained, self-sufficient, self-instructional/learning, self-explanatory, self-directed and self-assessing/evaluating. They expect such learning materials that provide for their control over their learning and enable them to learn according to his own pace of learning. Only then these materials facilitate their learning, and lessen their dependency on external support.

The learning material should thus be able to create a learning environment in itself for the students. These materials should give them the feeling as if some invisible teacher is there catering to their study and learning needs. They should feel that they are being motivated, taught, directed and assisted by someone. In so doing the personalized style of presentation might cater well to the needs of individual learners. Besides the knowledge of these principles (discussed in Unit-5) an understanding of the components of SLPs and the practicalities involved in development of these materials form important pre-requisites on the part of not only the course designers but also the course writers involved in such tasks. Let us discuss these in the sections that follow.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under "Answers to 'Check Your Progress' Questions".

1) What do you understand by SLPs? Justify the need for SLPs in distance education.

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7.3 COMPONENTS OF SLPMS

SLPMs consist of two broad components that serve specific pedagogic functions. These components adhere to the principles of effective learning. The components are:

- Active learning components
- Access devices

Let us discuss both the components in detail.

7.3.1 Active Learning Components

One of the basic principles of learning is the active participation of the learners in the learning process. The learner cannot learn just by being a passive recipient of information. He/she has to actively select appropriate content and involve himself/herself with the content. S/he learns by performing various pedagogic activities such as perceiving, comprehending and conceptualizing learning tasks / problems. We know from our experience and also from the theories of learning that eliciting a response is an essential component of teaching-learning activity. The instructional activities open up the genuine interaction between the student and the text. The activities stimulate the learner to learn. In other words, the SLPMS should make the student active and responsive. This is possible only when SLPMS are based on the principles of effective learning. The sequencing, presentation and language used in the materials should be appropriate to the level of the existing knowledge and the ability of the learners.

Learning activities are of different forms and are deliberately built into the teaching-learning materials. Since students remain away from both the distance teacher and the distance education institution during most of their study time, they will be learning in a passive manner mainly from the learning materials delivered to them. The distance teacher must therefore aim at breaking this passive learning by them by incorporating various pedagogic activities and through appropriate presentation of the content in print and non-print media. The activities particularly in SLPMS must help in engaging the distance learner in three broad types of learning activities. They are:

- Thinking:** The SLPMS are designed to stimulate thinking in students, among other things. The in-text activities are to be so designed that they motivate the students to be attentive and interact with the content being taught to them, i.e. being learnt by them. Objective type questions motivate them to think and find alternative answers to the questions asked. Thinking helps them retain knowledge, reinforce further thinking and solve problems.
- Writing:** SLPMS provide opportunities to students to reflect upon before they write and consolidate what they have learnt. Writing activities sharpen their communication skills, which is essential for a successful social life. Also, self-learning materials make them active and attentive. Activities related to writing involve thinking on the part of the students. Such activities have the following advantages.
 - strengthen the memory

- extend what has just been learnt to other items in the same area
- apply what has been learnt to a new situation
- test comprehension
- provide periodic check on learning of the distance learners.

iii) **Doing:** There is no second opinion on the fact that one learns best by doing. Practice strengthens learning. Some courses involving skill development require special practical activities for students or do something manually. These activities can be of different types, such as conducting experiments, collecting information/data, reading maps, drawing figures, etc. Practical activities are deliberately built into the SLPMs to increase active learning in students.

7.3.2 Access Devices

The access devices are essential components of effective SLPMs. As the term indicates, these devices make the learning materials more accessible to the students. The access devices are those devices which help the course writer go as close to the students as possibly he can and help them find their ways into the learning materials, i.e. allow them to go as close to the content as possible. The access devices provide an outline of the whole course or unit as the case may be. By using a variety of access devices in different formats, we can make the teaching unit interesting.

There are three main functions of the access devices. These devices:

- enable students to find what they need to study in the material, i.e. the easy means and ways to reach the content,
- make the content more intimate to the students and help them grasp what is presented in the learning materials, and
- perform the functions of a live classroom teacher, i.e. build a teacher into the learning materials.

Some of the access devices used in SLPMs are as follows:

- i) Title
- ii) Structure of the unit
- iii) Objectives
- iv) Illustrations
- v) Summary
- vi) Glossary

Let us discuss, in brief, about these access devices below.

i) Title

An appropriate title of the learning unit tells students what the unit is all about. The title, therefore, should be more explicit and communicative. The title of the unit /section / sub-section should be simple to learn and recall whenever required. The title must be stated clearly and specifically.

ii) Structure of the Unit

The unit structure is based on the concept mapping. Sections / themes and sub-sections / sub-themes are presented in the most logical sequence. Each section and sub-section draws the students’ attention to the learning points. They can have access to the learning points they want to study. They can straight away skip or skim any learning point presented in the structure, if they wish so.

iii) Objectives

In each unit of SLPMs, objectives are stated in behavioural terms, i.e. in terms of learning outcomes. The objectives help the course writers know the scope of the content to be included and discussed in unit. They also help the students know the standard to be achieved after going through the unit, course or programme, i.e. the objectives stated in terms of learning outcomes will tell the students of what we expected from them once they completed doing the unit.

iv) Illustrations

The illustrations, diagrams, charts, figures, drawings, tables, etc. help clarify the content being learnt. These devices make the learning materials more attractive and effective for the students.

v) Summary

The summary of the unit can help the students recapitulate and retain what is discussed in the unit. The summary can be presented in different formats to make instructional materials more interesting and attractive.

vi) Glossary

Some units are accompanied with the glossary of crucial key, new and technical expressions used in the unit. Glossaries also help the students understand the central point of discussion.

Besides the above mentioned access devices, it is the resourcefulness of the course writers to make learning activities more accessible to the students and help them promote knowledge, skills or attitudes thus gained through working on the instructional materials. One of the ways is by establishing appropriate horizontal and vertical linkages, at relevant places, with the contents in other sections of the same unit or with those in other units of the same Block or other Blocks.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

2) List out different access devices that you find in SLPMs.

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7.4 PRE-REQUISITES FOR COURSE WRITERS / INSTRUCTIONAL DESIGNERS

Keeping in view the key considerations discussed in sections 5.7 of Unit-5 and the components of SLPM in section 7.3 above, the distance teachers or course writers involved in developing learning materials for distance learners are expected to possess specialized knowledge, skills and competency. The main pre-requisites of the course writers preparing self-learning material for distance learners are as follows.

Familiarity with the system

The course writers should be fully familiar with the instructional system of the distance education institution concerned, the profile of students of the system and of the programme concerned, and the media approach followed.

Familiarity with the target group

In distance education system the students come from different backgrounds; educational qualifications, experience, socio-economic status, age, etc. They join distance education courses with different linguistic abilities, potential for learning, study habits, pre-requisite knowledge, motivational levels, rural-urban settings, and so on. The course writers involved in developing learning materials should be well aware of the needs, requirements and learning habits of the heterogeneous group of the students pursuing their study through distance mode. The learning materials are thus to be pitched at the right mental ability level of the students.

Familiarity with syllabus

To develop meaningful / effective learning materials the course writers should have thorough knowledge of the syllabus. Therefore, to claim that the SLPMs are self-contained and self-learning the course writers should first analyse the syllabus thoroughly in terms of learning experiences / tasks. Based on their inter-relationships, learning tasks should be arranged in an appropriate order. The writers should know the scope of the content to be covered in a particular course to help the students achieve objectives.

Familiarity with theories of learning

Unlike classroom-based learners, distance learners study independently at their homes or workplaces or any other place of their convenience. The course writers need to use a variety of teaching strategies to enable the students to choose the learning strategy suited to their needs. Relevant knowledge of theories of learning and communication on the part of the course writers will help them creatively design SLPMs that suit the individual students. SLPMs must be based on a solid foundation of learning theories and teaching norms to ensure optimum learning in the students. The emphasis here is that the principles of writing/developing SLPMs are derived from the principles of teaching and learning. Hence, the course writers should have a thorough knowledge of theories of teaching and learning.

Besides, a thorough knowledge of effective communication is also a pre-requisite for those who are involved in developing SLPMs for the distance learners. Clarity of content, explanation, language, presentation, feedback on their learning, etc.,

will go a long way in ensuring effective communication and meaningful learning by students. Needless to say that distance education, for that matter any teaching, is a process of sharing information, experience, ideas etc., to achieve the mutually agreed upon objectives of teaching and learning. Sharing of experience or ideas depends on effective communication between the sender (teacher) and the receiver (learner) of information and/or messages. More so, communication becomes effective if it takes place in the language fully understood by the receiver, meeting his/her needs and requirements.

7.5 PREPARATION OF AN SLPM UNIT

Self-learning print materials (SLPMs) are prepared and developed for the purpose of providing programmed instruction to the distance learners. Programmed instruction, in simple words, is the teaching and learning process in which lessons are planned, prepared and produced in advance to provide the opportunity for the learner to have active participation, immediate feedback, success experiences and gradual approximation in the learning process so that he/she can gradually progress according to his/her own pace of learning, ability, interest and convenience with or without minimum assistance from other instructors. Distance education programming is done in the form of independent, but interlinked modules that are called courses. These courses are generally divided into a few blocks. Each block, in turn, contains a few units. Being a second year student of B.Ed programme, you must be, by now, clear about what a programme, course, block and unit mean. Even in technologically developed countries it is print, which is mostly used as the master medium of teaching and learning in distance education. Considering the importance or popularity of print medium the emphasis in this section is on preparation of the materials in print medium. The process of writing/repairing and developing an SLPM explained herein, however, will be useful even in preparing SLPMs in non-print media. Since a unit forms a basic part of a block of any course, the focus here is on the process of preparing an SLPM unit.

The process of preparation of an SLPM unit can be conveniently divided into three stages. They are:

- i) Arranging topics (concept mapping);
- ii) Preparing unit structure; and
- iii) Writing the unit.

Let us now discuss each of them.

7.5.1 Arranging Topics (Concept Mapping)

The first and the foremost task in writing learning materials is to select topics or identify all the relevant concepts and learning activities and arrange them in the most possible logical sequence. The topics, the concepts and the learning objectives are interrelated. A topic tells us what the subject or the point of the presentation is; and the topic may have many concepts. The objective(s) of the unit determine(s) the depth and extent of coverage of topics and concepts and vice-versa.

Identifying and arranging topics provide the writer the 'concept mapping' of the unit contents. The concept mapping is a process in which the unit-writer identifies

key concepts and sub-concepts in a body of subject matter and arranges them meaningfully around the focal point. A typical concept map contains three elements:

- i) Concept, i.e. perceived regularity in events,
- ii) Proposition, i.e. linking words between concepts. This shows the relationship between different concepts and even propositions, and
- iii) Hierarchical structure, i.e. there is a hierarchy in the way events take place.

The students' pre-knowledge and the nature of the content form the basis for arranging topics and concepts. In other words, the sequencing of content is learner- and learning-oriented. It reflects on the resourcefulness and creativity of the unit designer and the unit writer. The principles of teaching and learning are followed from the very beginning of course development. In any learning, there are certain skills to be mastered or certain information to be learnt before the student moves on to the next stage. It is, therefore, essential to decide upon the order of topics, concepts and the relevant information, skills, etc. The unit writer, wherever and whenever necessary, can seek advice in several ways from the advisory committee, subject experts, instructional designers, educational technologists, and others.

7.5.2 Preparing Unit Structure

In distance education a unit describes a unified theme of knowledge. Different topics are covered in each unit. As mentioned earlier, each unit is self-contained. To make learning materials more accessible and self-instructional/learning, we present the unit structure in the beginning of every unit. The unit structure, as you have seen in the units of previous block and this block and that you can see in the units in the rest of the two blocks of this course, helps the student understand what constitutes the unit. The unit structure helps the student not only to have easy access to the desired learning point in the unit but also to skip or skim the point according to his/her needs and requirements. The unit structure presents a clear outline of how the content or the learning activities are conceptualized and presented by the course writer. The unit structure with clearly differentiated and logically arranged learning activities makes the text more learner-oriented. Each learning activity is given or allotted a serial number. Care is taken that numbering is simple and clear, and makes the learning activities more accessible. A typical unit structure, in general, includes the following (also you can revisit the schematic representation of a unit given under introduction to Block 1 in Block 1 of this course).

X (Unit title)

Unit Structure

- X.0 Introduction
- X.1 Objectives
- X.2 (Main topic I)
 - X.2.1Sub-topic 1
 - X.2.2Sub-topic 2
 - X.2.3Sub-topic 3
- X.3 (Main topic 2)
- X.n (Main topic n)
- X.(n+ 1) Summary

X.(n+2) Answers to 'Check Your Progress' Questions

X.(n+3) References

'X' stands for number of the unit and 'n' stands for the nth 'topic or sub-topic or parts as they are arranged. Here, you can pause a while and take a look at a few unit structures available in this Block and in other Blocks of this course or other courses of BEd programme, and come back to proceed further here. (That will broaden your understanding of unit structure as you can notice some minor variations, if any, in the unit structure in different courses, depending upon the approach of the unit designer/course writer to the unit structure).

It may be noted that the References are, as usual, given towards the end of the unit, in which Suggested Readings are also included at the end.

7.5.3 Writing the Unit

Since there are many ways of teaching and learning, there can be various formats/styles of presenting SLPMs. The course writers, therefore, should know various ways of presenting learning activities.

There are three main parts of a unit — the beginning of the unit, the main body and the ending of the unit. Let us discuss each part, in brief.

- i) **Beginning of the Unit:** This part of the unit usually includes the following access devices:
 - a) **Unit Structure:** Every unit begins with the unit structure or the contents list. Being pedagogically more meaningful the expression 'structure' is preferred than the contents list. This device has already been discussed under sub-section 7.5.2 above.
 - b) **Introduction of the Unit:** The main purpose of an introductory section is to introduce to the students what they will be studying in the unit. Like an effective classroom teacher, the introductory section of a unit provides necessary guidance to the student to facilitate his learning. There can be several ways of writing the introduction of a unit. There are generally three components of an introduction.
 - i) *Structural component*, i.e., linking the contents of the unit with what has already been discussed or what the learner has already studied. In other words, the introduction should be based on the pre-requisite or prior knowledge of the students.
 - ii) *Thematic component*, i.e., presenting and highlighting in a very friendly and personalized style an overview of what is being dealt in the unit.
 - iii) *Guidance component*, i.e., providing necessary instruction (related to the content of the unit) to facilitate learning.

A resourceful course writer provides guidance about what a student is supposed to do before he starts reading the unit. Guidance can be given with reference to time, special activities, equipment, books, etc., needed for the unit and instruction.

- c) **Objectives:** Defining objectives in terms of learning outcomes is useful for both the course writer and the students. Well defined objectives, in terms of learning outcomes, help in planning, developing, evaluating and revising any learning activity until the desired outcomes are achieved. There can be three domains of objectives: knowledge, affective, and psychomotor. Even within each domain the objectives can be set at lower or higher levels. The number and the level of the objectives should be according to the mental level of the students, and they should be achievable. Moreover, we need to ensure that the objectives set for the unit/students are measurable. Considering the features of distance education, we have to devise ways and means to assess the accomplishment of objectives. It implies that we should be realistic in setting objectives for a unit. Sometimes, objectives are placed before the introduction, as you can notice in the case of certain courses of IGNOU.

ii) **Main body of the unit:** This part of the unit includes the presentation of learning content/activities to be learnt by the learners. We should decide on how much of the materials/learning activities we would be including in the unit. It would be appealing if the content is aimed at achieving the objectives. It is always good if the content is divided into small but manageable learning steps or sections. Each section should present at least one new point, and exercises related to that/those points. As you have already seen in this course, these sections are further divided into sub-sections. Each section and sub-section is given a suitable title and, wherever necessary, a serial number. The title should be easy to recall or remember, and should communicate the essence of what is discussed thereof. The title should reflect on objectives. The main body of the unit will have the following broad features.

- a) **Logical arrangement of learning points:** The learning steps are logically arranged so that the learner proceeds from one learning step to another. And there should not be any abrupt gap or break between two steps. In other words, there should be a smooth transition from one learning point to another. The logical arrangement of content will ensure linkage between/among learning points. There can be linear and/or branching approaches to arrange learning events. In the unit structure also there should be a display of continuity and consistency of learning events.
- b) **Ordering of content:** The learning activities are arranged along the principles of teaching and learning. The principles of effective teaching proceed from the known to the unknown, from the simple to the complex, from the concrete to the abstract, from general to the particular, from actual to the representative, and so on, and are followed in writing a unit. Such an order of learning activities will have a logical flow and will create continuity of the desired focus.
- c) **Personalized style:** The course writer should be sympathetic and generous in discussing the content adequately. The content should be discussed in a conversational style and we should address the student directly in a friendly, informal tone. The student should feel as if he is listening or talking to the invisible distance teacher. Our discussion

should establish an emotional link with students through varying styles of presentation of the content. Efforts should be made to link the content with the students' life experience keeping in view the need for variety and change of pace to sustain the interest of students. At this point, you may recall the principles of self-instructional/learning materials such as self-directed, self-contained, self-explained, etc. that are to be maintained in presenting the content. Here, we should think of using more than one means of communication.

- d) **Language:** The quality of language is decisive factor in assuring the quality of SLPMs. The language used should be warm, friendly and, above all, grammatically correct. Long, unfamiliar and double negative words should be avoided, unless they are demanded by the text. Language should attract the students to read the text, involve them in the discourse and interact with the text. Personal pronouns such as 'You', 'I' and 'We' should be used frequently.
 - e) **Illustrations:** Illustrations, diagrams, charts, examples, etc., form an important feature of SLPMs. Illustrations create interest in the students, stimulate their imagination, increase their comprehension and help them retain the knowledge. Illustrations make the abstract concepts concrete. There is no definite formula to decide the number of illustrations/diagrams in a unit. It depends on the nature and difficulty level of the concepts being taught / learnt. Remember, simplicity and clarity of illustrations constitute the guiding principles of effective communication. Illustrations linked with real life experience will make the unit more lively, impressive and interesting.
 - f) **Assessment:** Assessment helps in monitoring whether the student is moving towards the set objectives or not. Therefore, each step should be followed by an assessment item. Assessment also helps the students learn better and provides them feedback about their progress (self-assessment). Besides, while the students work on assignment question it (assessment) initiates a dialogue (pedagogic interaction), breaks the feeling of isolation among students, and reinforces their learning.
- iii) **Ending of the unit:** This is the last part of unit where the important learning points discussed in the main body of the unit are summarized, in brief. Summary helps learners recall the gist of the discussion and reinforce their learning. Thus, this component is a sort of recapitulation of the main learning points. It reminds the students of all the activities/tasks completed or learnt by them in the unit. This part contains, besides summary, glossary, answers to self-check exercises/check your progress questions, and references and suggested readings.
- a) **Summary:** The summary of the unit can be presented in a variety of ways/forms. It can be in paragraphs, points, charts, tree diagrams, etc. The summary section should be comprehensive enough to provide proper feedback to the students and also to get our messages across.
 - b) **Glossary:** The crucial, key, new and technical words are better explained to the students to enhance their comprehension. The words with multiple-meanings need to be defined with proper explanation. This leads to better understanding of the working definition of the terms, particularly the most crucial ones.

- c) **Answers to self-check questions:** The answers to the self-check questions, given in the text at the end of different sections/sub-sections, are provided at the end of the unit. These answers provide feedback to the students. These answers can be given in different ways, such as hints, full-answers, model answers, etc., depending upon the type and nature of self-check questions. The answers should be clear and comprehensive. Also, these should be in consonance with the number of words, number of lines, etc., prescribed under the respective questions. Further, these answers should be clear in terms of language, explanation offered, etc. The answers should, however, be based on what has been discussed in the unit.
- d) **References and suggested readings:** A list of references and suggested readings is presented to help those students who want to know more about the content of the particular unit(s) or topic(s). The course writer, however, should ensure that the readings particularly are useful, relatively cheaper and easily available in the market. We can even suggest books as essential or optional or helpful in doing the assignment responses and/or term-end examinations. There should be complete information about the book(s) such as author, year of publication, title, publisher, place of publication, and relevant chapter(s) / page(s).

Once the unit is prepared by the unit/course writer, it requires editing. You will know about editing in section 7.6.

7.6 EDITING OF THE UNIT

Different writers with different writing skills may contribute the academic content to the unit. They usually work independently on separate units and one does not know what the other has presented in his/her respective unit. As far as the content presentation and the quality are concerned, there will be overlapping and unevenness which will have to be smoothed out by an editor who has good grasp of the subject matter. Language will be another matter of concern because there will not be uniformity of style. If these can be taken care of, somehow; still there will be need for someone who can shape the materials into distance-learning or self-learning format, incorporating or introducing the relevant features of self-learning texts. These situations call for editing of the material prepared, in order to develop it properly. There are at least three distinct types of editorial work:

- **format editing** (to be done by educational technologists or distance education experts).
- **content editing** (to be done by senior academics in the field).
- **language editing** (to be done by language experts who have adequate command of the language, which is the instructional medium).
- **copy editing** (to be done by the technical experts with adequate knowledge and experience in printing of the material).

Obviously, the editor in the classical course team does not have to worry much about the above types of editing because the three experts concerned are already there in the course team and they work in unison exchanging notes and drafts at every stage of course development on regular basis during the meetings of the course team. This is a classical situation which is rarely followed.

On the other hand, in the second situation (in which units are written by unit writers and later format edited, content edited and language edited by other experts in that sequence), which is the case in many ODE institutions, our concern is that the three types of editing (format, content and language) need to be done in a slightly different way.

The three primary concerns of any editor in charge of developing self-learning materials are:

- i) the educational effectiveness (i.e. making the text a self-learning one following principles of self-learning, independent-learning, etc.),
- ii) the academic credibility (i.e. the level, adequacy, accuracy of the content), and
- iii) the readability of the text (i.e. simple, conversational style, appropriate level, etc. of language).

If the editor happens to be a senior academic in the given discipline who can take care of the content part, then the other two can be managed with the help of a distance education expert and a language expert. If not, then, whoever is responsible for developing the course(s) will have to look for persons who can do the three types of editing simultaneously. When you do not get an ideal person with a combination of all the three editing skills, you have to look for persons who can edit the units independently focusing on only of the three aspects in which he/she has the expertise. The academic who coordinates these functions is called a course coordinator. He/she can even consider doing these three types of editing himself/herself, subject to having the expertise and experience to do so, which occasionally can result in very good quality material.

How the three types of editing can be done, in the absence of a course team in the classical sense, will be the focus of our discussion in the following sections. Before that let understand what types of course writers we come across.

Course Writers: Possible Types

If you were a course coordinator and perceptive you would have noticed, during the meeting of the course writers orientation, at least three typical responses from these writers:

One type of response may be from the good subject experts who promise to give good content input but would not bother much about your systemic needs and the needs of the learners (For these writers, the content and its quality is the most important one. The rest may be important for you but not for them, for whatever reasons. However, you can certainly get good quality content from them). You are free to put the content in whatever format you choose to.

The second type of response might be like this: “We will try our best to put the content in the way you have suggested. But if there are gaps, do not blame us. You will have to do the rest”. (This group is usually receptive to new ideas and experiments but may not promise the Moon. They may give content of acceptable quality too).

The third type of response may be from the ‘writers for all reasons’. They might have assured you something like this: “Young man! Don’t worry about our

contribution. We have been in this business for the past so many years and we have written scores of books and hundreds of articles on the same topic. As for your distance learning format, it is child's play for us. You will get our units in time but send our payments promptly after receiving them". These are the 'high profile' writers who usually move closely with heads of institutions, senior managers and bureaucrats with a propensity for much visibility and less sincerity. You have to accommodate them because these are the persons who lend their names, if not the content of high quality, an act which the institutions may think important to earn credibility and acceptability for their pioneering efforts. (For political reasons and ironies such as these may have to be accepted as contributions, in whatever shape it may reach you).

The last category may at times send you their units in time or never. The second category would send in their units more or less in time with an acceptable content in a reasonably good format, incorporating the features of self-learning materials to the extent possible within the time frame. The first category would send us their units in time or, if they are otherwise busy, after a few reminders. The quality of the content supplied by these writers will be of very high quality, though they may not have put it in the format desired by you.

In short, you may receive the units of the following three categories:

- i) Units in the form of rough drafts which need heavy editing, padding and polishing in terms of content, format and language.
- ii) Units which give you excellent content but need transformation in terms of format and presentation.
- iii) Units with acceptable quality of content and generally good in terms of format but needs some language editing and also some polishing of content and presentation.

Whichever category of units you receive, they all must pass through one or the other of the three types of editing we mentioned earlier: **format editing**, **content editing** and **language editing**. We shall discuss each one of them in some detail in the following sections.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under "Answers to 'Check Your Progress' Questions".

3) Briefly describe the possible three types of Course Writers. (You can think of other possible types too). Comment on these types from the point of view of an editor.

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7.6.1 Format Editing

What we mean here by ‘format editing’ is nothing but the educational technology inputs which come from the educational technologist working in a typical course team situation. In the absence of facilities for a full-fledged course team working as a team, alternative strategies must be found to get the same output and quality. In Indian situation, content editing and language editing have been done in the correspondence lessons of the old type too. What is really an additional input is the attempt to improve upon the earlier or existing practice by bringing in the advancements of educational technology in presenting the otherwise good content. Let us look at the figure given below.

Structure	Contents
1.0 Introduction	Introduction 4
1.1 Objectives	1 Clarifying the question 4
1.2 Concept of Adult Education	1.1 Education and pay 4
1.2.1 Adult Education	1.2 Controlling for various factors 7
1.2.2 Education of Adults	1.3 Introducing the data 8
1.2.3 Education for Adults	2 The two-sided Mann-Whitney test 11
1.3 Relevant Terms Explained	2.1 The first steps 11
1.3.1 Fundamental Education	2.2 The Mann-Whitney test statistic 12
1.3.2 Formal, Non-formal and Informal Education	2.3 Confidence intervals 24
1.3.3 De-schooling	3 The one-sided Mann-Whitney test 25
1.3.4 Recurrent Education	3.1 A one-sided alternative hypothesis 25
1.3.5 Further Education	3.2 The one-sided Mann-Whitney test 26
1.3.6 Continuing Education	3.3 When to use the Mann-Whitney test 33
1.3.7 Correspondence Education	4 The Wilcoxon matched pairs test 36
1.3.8 Distance Education	4.1 Pairing 36
1.3.9 Open Learning/Education	4.2 The Wilcoxon matched pairs test 37
1.3.10 Lifelong Learning/Education	4.3 When to use the Wilcoxon matched pairs test 45
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A. SLPM Format (an IGNOU Unit)

B. SLPM Format (an UKOU Unit)

Fig. 7.1: Two Different Formats of SLPMs

The very physical look of formats shown in figure 7.1 would suggest you that distance learning lessons have certain special features which are not there in the lessons normally used in the classroom teaching. But the “formats” are not just physical layout, design and font size. They have certain useful pedagogic and learning principles embedded in them. These pedagogic and learning principles, in fact, warrant the changes in the physical design and layout of the texts in order that the intended learning objectives are achieved effectively. In any format of a SLPM unit, you can see three main components: the beginning, the main body and the end. Each component includes some of the pedagogic and the self-learning principles in a variety of ways allowing enough scope for the text to remain open and flexible. These are the *access devices* through which learners comprehend the content. We shall see what the pedagogic and the learning principles are and how they get incorporated in SLPMS in the following sub-sections.

A) The Beginning

Let us look at Fig.7.1 again.

In the IGNOU unit, for example, the ‘structure’ gives you the entire list of contents discussed in the given unit. Of the contents given in the ‘structure’, the first two sections 1.0 and 1.1 in the ‘structure’ itself constitute the beginning of the Unit. What do they signify?

Of course the ‘**Structure**’ itself gives us *firstly* an outline of the unit. By looking at the list, we would know what we should look for in this particular unit. *Secondly*, this preliminary information is also significant in that it prompts us to start our learning exercise. This psychological preparedness or readiness to learn is important for any learning process. *Thirdly*, we would know the scope of the unit and thus we know what we should expect from the unit.

Section 1.0 (i.e. ‘**Introduction**’) serves usually three main purposes:

- It establishes a logical linkage between the previous unit (or knowledge) and what is going to be presented in the following unit;
- It gives an overview of the content presented in the unit more explicitly than what the ‘structure’, i.e. list of contents does;
- It also gives the learners study guidance wherever needed as to how the learners can proceed or what the pre-requisites are for their successful study of the unit;

As a format editor, you have to look for the above three elements in any ‘introduction’ and if you do not find at least two of them, then, you will have to rewrite the introduction afresh.

Section 1.1, i.e. ‘**Objectives**’ enables the learners to focus their study and they will legitimately look for the necessary information/content from the unit to achieve the set objectives. The learners will also try to relate the objectives with the sections and sub-sections of the unit. Whether the objectives should be set in behavioural terms or instructional terms and at what levels will have to be decided by you, depending on your purpose and also the school of thought you belong to.

In the courses of some programmes of IGNOU, ‘Objectives’ precedes ‘Introduction’.

B) The Main Body

Look at the 'Structure' again in Fig. 7.1 once again. Sections 1.2 to 1.6 actually contain the 'main body' or the content of the unit. You will notice that these sections are further divided into subsections. In the actual text, each section, sometimes some important sub-sections too, will be followed by an activity -- *an exercise, a Check Your Progress exercise, or a Self Assessment Question (SAQ)*.

Editing of this part of the unit pertains to content editing. The course authors or writers play the major role in selecting and presenting the content. However, for some degree of uniformity in selecting and presenting the content and pitching it at the appropriate level, you need someone to go through the entire course, preferably all the courses pertaining to the programme to smoothen out the possible unevenness of the content level and the style of presentation. The responsibilities of a content editor are crucial in ensuring quality as well the academic credibility of the courses. If the content editing is not done properly, then, the quality of the course/programme will suffer, notwithstanding the case given to the technical and production aspects of course preparation.

Editing at this level must focus on the following aspects:

- Relationship or link between the objectives set at the beginning and the content presented in the main body of the unit;
- Appropriateness of the level, adequacy and the quality of the content (It does not serve our purpose, if the authors present excellent content ignoring the level of the learners. The level of content, for example, difficult enough for doctoral degrees, will be no good for first year undergraduate students who are initiated to the basic concepts of a given course/discipline);
- Logical sequencing of the content;
- Explanations, illustrations, examples, etc wherever necessary;
- Spontaneous flow of ideas and arguments;
- Relevance of information given;
- Updated and accurate information;
- Presentation of content in small and manageable chunks in the forms of sections and sub-sections;
- Enough number of activities to break the monotony of the reader and to help him access the main points of the discussion;
- Sign positioning through headings, bold or italic, font sizes and numbering.

The above list is only illustrative and not exhaustive. Rountree (1991) and Jenkins (1985) will be useful in giving you comprehensive treatment of the issues related to content selection and presentation. Lockwood (1994) gives you an in-depth analysis of the learning activities possible in self-learning texts. "ES-312: Design and Development of Self-Learning Print Materials" is one of the courses of IGNOU's (India) Post Graduate Diploma in Distance Education Programme which discusses many of the relevant issues related to course development for distance education in the context of the developing countries.

The key elements in content editing, however, relate to the points listed above. But how to ensure that the above points are taken care of? Here are some clues:

- Check whether the objectives are kept in view when the content is presented in the main body (If not, either change the content or modify the objectives in the second draft of the unit. Remember, no draft is good enough to be final).
- Present each main idea in a section and the supportive ideas in sub-sections.
- Do not allow too many ideas and details to crowd the text (It will be intimidating and stifling).
- Draw a concept map to ensure logical flow of ideas and arguments (of course, it depends on the requirements of given discipline).
- Give at least one activity or exercise at the end of every section, and if necessary, after a sub-section too. Vary the level of activities and avoid trivial exercises and activities demanding too much from the learner. (For example, there is no fun in this exercise, “When did India become independent?”, if it is given at the end of the section which starts with “India became independent on 15 August 1947”. Similarly, here is no point asking your learner to answer a question, which is good enough for a tutor-marked assignment).
- While numbering the sections and sub-sections, generally do not go beyond three digits (i.e. 1.2 and 1.2.1 are good enough); and if necessary go up to 1.2.1.1, in certain sections; but going beyond, up to five digits (i.e.1.2.1.1.1) will lead to confusion and awkwardness.
- Use familiar examples, photographs, graphics, etc. to help the learner grasp the main points clearly and easily.
- Start the presentation from the known and then move on to the unknown or the more difficult part of the content.
- Try to incorporate the feedback you may have received from your colleagues, potential students, previous batch of students and experts at the time of developmental testing.
- Read the unit as student would identify the possible areas of difficulties. Check them with the opinions of your peer group and the potential students.

Some writers have the skills to present the content interestingly even without the above ‘**access devices**’. But the access devices always help you to enhance the understanding of the learner. While introducing the access devices, it is always advisable that the format editor (i.e. distance education expert) and the content editor consult each other to avoid any possible jumbling of content sequencing or illogical division of sections and sub-sections.

C) The Ending

This is the third and last component of a self-learning unit. Here you will have the following items:

- Summary of the main points and/or conclusions.
- Suggested possible answers to the Check Your Progress exercises / SAQs.

- Glossary of terms, wherever necessary.
- References, to authenticate and acknowledge the sources of material used.
- Suggested Readings list, i.e. a list of books and articles for further reading by the learners.

The editor should take care that the summary and the answers to the SAQs serve the intended purposes. The **summary** should help the learner recapitulate the main ideas already discussed. The **answers** should give the feedback and reassure the learner about his learning. The **glossary** must act as an instant dictionary with contextual meanings of the terms explained. **References** must appropriately authenticate the sources. The reading list should consider the availability, readability and affordability of the books/articles recommended.

7.6.2 Content Editing

Content editing is to be done by competent (senior) academics in the field. Content editing, thus, must ensure the academic relevance, the quality and the logical presentation of the content.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

- 4) Suppose, you have joined a distance teaching institution very recently. You did not have any exposure to the system. You are asked to coordinate a course in your own academic discipline. How will you go about the task?

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7.6.3 Language Editing

Ideally, language editing must be done by the content editor. In a situation where the mother tongue of the learners happens to be the language of the medium of instruction also, usually the language editing is done by the course writers or the general editor focusing on the style and the difficulty level of the language used in writing the text. But in a bilingual or multi-lingual situation where the medium of instruction is not the mother tongue of the writers and the readers (learners),

then a number of problems arise in the entire process of educational transaction. In India and many other developing countries English still remains the main instructional medium at the level of higher education. The role of English in education in general and in higher education in particular cannot be ignored in these countries. Even if alternatives are possible, they cannot be brought in overnight. In such a situation, we have to use English the way it can serve us best.

The issues related to English as a medium of instruction in distance education in 11 Commonwealth countries have been studied in depth by Koul and Creed (1901). Others have drawn the attention of distance educators to the various issues of language as a crucial factor in the practice of distance teaching. In all these studies, we notice that one common issue that stands out prominently is the need for improving the four basic skills — reading, writing, speaking and listening — of distance learners to cope with their study materials written in English.

What is true of the distance learners is also true of the distance education course writers / authors in the developing countries. The writers who write the learning materials in English do not usually have the command of or the facility with English language which they have acquired as a second or third language under extremely adverse conditions. It is not uncommon to see academics with doctoral degrees speaking and writing poor English. Since there were / are no remedial measures to correct their English, they continue with their own English, which may be pardonable in informal situations but unacceptable in formal and professional contexts.

Though we can find **explanations** for this phenomenon in Linguistics (historical linguistics, socio-linguistics and psycho-linguistics) we cannot find **solutions** to the problems created by incorrect uses of a language, particularly English which remains the mainstay of writing distance education courses in the Commonwealth countries.

Many course writers who write their units/lessons in their respective disciplines cannot simply overcome their linguistic limitations. The only solution that seems to be possible in the present situation is to get the units linguistically edited by those who have a reasonable command of English. Here, two things are important. The subject expert must realize that unless his expertise is expressed through the medium of (English) language, practically it has no value and academically it cannot enjoy any status; and the language expert, on his part must know that his job is to convey the content in the best possible manner without distorting the ideas and the concepts presented in the content. Neither the content expert nor the language expert should claim superiority over the other, if their efforts should bear fruit.

During the process of language editing the following must get the primary attention:

- The linguistic abilities of the learners,
- The level of the language matching the level of the content,
- The grammar and the spelling,

- Vocabulary and technical terms,
- Syntax and the idioms,
- Simplicity and clarity,
- Conversational and friendly style.

The language editor as well as the course writer should have some idea about the linguistic competence of the learners whose mother tongue is not English. But, who are your learners? It is an extremely difficult and complex question to answer. In a country like India, if you consider the range of learners of whatever programme you choose, you are bound to meet with a heterogeneous group with varying linguistic skills in English from the poorest to the best. For example, is there a definite standard to measure the linguistic competence of a student who has completed his school finals? The answer is an emphatic 'no', because the standards vary from school to school and from region to region.

It is this indeterminable state of the linguistic competence of the distance learners that results in disappointing performance in courses, particularly if the admission policies are liberal. Pending an academic policy decision that needs to be taken by the institutions concerned, we the academics responsible for the content and the presentation must arrive at a conclusion about our average learner and pitch the language accordingly. Our notional standard of expected linguistic competence to complete the given course will certainly help us determine the difficulty level of the presentation of the content.

Of course, the difficulty level of language will depend on the nature and the density of content. You may have noticed that in many courses meant for the first year students of B.A or B.Sc of Indian Open Universities, the content level is high and dense and the presentation is hardly user-friendly. This is so, because there has been little or no appreciation of the linguistic competence and previous knowledge of the learners.

As a rule of thumb, at least we should, and we can, ensure the following:

- Writing the sentences correctly (i.e. without grammatical errors).
- Writing the words without spelling errors.
- Following the UK or USA spelling consistently (I would follow the UK spelling as it is widely used in our country).
- Writing simple and short sentences.
- Using active voice wherever possible.
- Using the correct idioms, phrases and expressions.
- Employing personalized, conversational and friendly style to make the text user-friendly and also make the learner feel that you are talking to him through your writing (e.g. "You", "I", "We").

The language editor can always consult the content expert while presenting the concepts and difficult ideas. The language editor may not be familiar with certain technical terms and discipline-specific jargon, and because of this unfamiliarity he may "correct" the text. These corrections will become errors and will result in confusion. Therefore, wherever the language editor has doubts about the concepts and the ideas presented, he/she should consult the content expert before correcting the language.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

5) Explain the importance of presenting the content in simple and clear language.

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7.6.4 Copy Editing

Copy editing is a mechanical aspect of the editing process. The house style followed by an organization regarding the layout of the text is taken care of by the copy editor at this stage. Before Desk Top Publishing (DTP) came into practice, manuscripts were edited by professional copy editors primarily to assist the printer to bring out the text in the way the organization wanted it. So the focus of copy editing is on the following aspects which constitute the house style:

- Inside cover page, the first page or the starting page of the block / book wherein you mention the names of the experts, unit writers/authors, editors, production staff, etc., and also the titles of the course, block and the units;
- Specifications about the font sizes of the unit title, sections, sub-sections, subheadings, etc., and the numbering;
- Starting of each unit (whether on a new page, what should be the space allowed before the unit starts, etc.);
- Space for activities, exercises, etc. within the text;
- Conventions of arranging tables, figures, graphics, photographs, etc. and placement of titles for all these items and deciding appropriate places and space for them;
- Alignment of paragraphs, the margins, etc., to keep the uniformity of the physical look of the text;
- Sharpness of letters/characters and space between words and lines;
- All other items of layout in a printed text.

In the pre-DTP days, copy editing had to be done by a professional copy editor. These days everyone who knows how to operate personal computers (PCs) do the copy editing as per the specifications decided by the faculty. The specifications for the layout and font size of a unit could be decided by the faculty or followed as per the set institutional practice, if any, before the materials are sent for printing.

7.7 LET US SUM UP

In this unit, we explained the concept and need of SLPMs in distance education. We have discussed two components – active learning component and active devices – of SLPM unit with a view to highlighting their importance in a self-instructional/learning unit. We have emphasised the pre-requisites of course writers/designers, which will help in identifying appropriate course writers. We have also discussed the steps to be followed in preparation of an SLPM unit alongside its three essential components/parts – the beginning, the main body and the ending.

Editing is crucial in assuring quality of learning materials. The editor/course coordinator has a major responsibility in the process of developing quality learning materials for distance learners. In view of this, we have focused on:

- the role of editing in the different situations obtaining in the distance teaching institutions,
- the range of editorial concerns in the development of self-learning materials, and
- the different types of editing such as content editing, format editing, language editing and copy editing, which may be necessary, under the given situation.

We hope the contents of this unit are in tune with the objectives of the unit.

7.8 ANSWERS TO ‘CHECK YOUR PROGRESS’ QUESTIONS

- 1) SLPMs are the specially designed and developed instructional/learning materials to meet the needs, interests, abilities and problems of distance learners. In these materials the distance teacher performs, through media and technology, the roles and functions of a classroom teacher who does them mostly through oral medium. In these materials the instruction is well programmed in print materials with a view to providing an opportunity to the learners to effectively participative, get immediate feedback and gain success experiences. The SLPMs enable the learners to learn according to their own pace of learning, interest, ability and convenience with or without minimum assistance from the distance teacher / instructor / institution.

The SLPMs are essential for distance education because they address many problems that may arise in the process of isolated learning by individual distance learners.

- 2) The access devices that are generally present in the SLPMs include: i) title of the unit, ii) structure of the unit, iii) objectives, iv) illustrations, v) summary, and vi) glossary.
- 3) I can think of the following three types of course writers:
 - i) Those who can give excellent content in a desirable self-instructional format;

- ii) Those who can give excellent content, but not in the desired self-instructional format. In this case, I will seek the help of the educational technologists, as may be required;
 - iii) Those who can give an average content in a somewhat self-instructional format that need heavy editing in content and format.
- 4) In the first place I would read the relevant literature to understand the principles and process of course design and development in distance education, and will also discuss the same with experienced senior colleagues regarding the practical difficulties in executing the task.

I would, then, consider the content requirements of the course concerned. I would contact the experts in the field, and after getting their consent to be the course writers, I would have a meeting with them wherein I will discuss and explain the relevant aspects of SLPs, the associated issues and concerns, and make them clear the format in which I want the units/lessons from them. I would give them a definite schedule to get the units and decide on the payment norm as well. Once the units are received I would go through them first, do the format editing to suit to the house-style, and get its content and language edited by the experts. If necessary, I would seek the help of the educational technologists and others to finalise the units.

- 5) Learner can have effective access to the content through language. Unless the language used in a unit is simple and clear, the distance learner studying in isolation will have problems in understanding it. S/he cannot contact others to explain the presentation of content at every stage. Simple and clear language not only motivates the learner but also enhances self-learning by the distance learners.

7.9 REFERENCES

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7.10 UNIT END EXERCISES

Unit End Questions

You may write brief notes or full-length answers to these questions in your own interest. It might help you during your preparation for examination.

- 1) Explain the concept, need and components of SLPMs (1000 words).
- 2) What are the pre-requisites for writers / designers of SLPMs (500 words).
- 3) Explain the process of preparation of an SLPM unit. Give suitable examples at each stage. Of the process (1000 words).
- 4) Discuss different types of editing involved in development of SLPMs. (1000 words).



Questions for Critical Reflection

- 1) Development of SLPM Unit is not every one's cup of tea. Justify the statement.

Activity



Select a lesson from a textbook of the subject you are teaching for any class of your choice. Or you select a chapter from a book of on the subject you teach. See that it has about 2500-3000 words. Read the selected lesson / chapter thoroughly with a view to attempt to transform it into a self-learning print material. You read this unit also once again and transform the selected lesson / chapter into an SLPM unit.

UNIT 8 DEVELOPMENT OF E-LEARNING RESOURCES

Structure

- 8.0 Introduction
- 8.1 Objectives
- 8.2 E-learning: What, Why and How?
 - 8.2.1 Concept
 - 8.2.2 E-Pedagogy and Design Process
- 8.3 Types of E-learning Resources
 - 8.3.1 Digital Print
 - 8.3.2 Digital Audio
 - 8.3.3 Digital Video
 - 8.3.4 Web-based Resources
- 8.4 Digital Content Creation Tools
 - 8.4.1 Visual Content Creation Tools
 - 8.4.2 Image Sourcing, Creating, Editing and Uploading Tools
 - 8.4.3 Interactive Content Creation tools
 - 8.4.4 Infographic and Chart Maker Tools
 - 8.4.5 PowerPoint Presentation Tools
 - 8.4.6 Audio Creation Tools
 - 8.4.7 Video Creation Tools
 - 8.4.8 Media Integration tools
 - 8.4.9 Tools for Writing for the Web
- 8.5 Delivering E-learning
 - 8.5.1 Learning Management Systems
 - 8.5.2 Learning-Content Management Systems
- 8.6 E-learning through Web 2.0 tools
 - 8.6.1 Web 2.0 tools: The Concept
 - 8.6.2 Blogs
 - 8.6.3 Wiki
 - 8.6.4 Social Networking
 - 8.6.5 Social Bookmarking
 - 8.6.6 Micro-blogging
- 8.7 Let Us Sum Up
- 8.8 Answers to 'Check Your Progress' Questions
- 8.9 References
- 8.10 Unit End Exercises

8.0 INTRODUCTION

In Units 5, 6 and 7 you studied about designing SLMs, media and technology for ODE, and development of SLPs respectively. These units collectively have provided you an understanding of how media and technology transformed the concept and the process of teaching and learning in distance education – a shift in focus from conventional teaching and learning. The Information and

Communication Technology (ICT) can empower students in directing their own learning, learning at their own pace and in constructing their own knowledge using various print, non-print and electronic media, devices and software. Innovative use of emerging ICT has increasingly paved the way for more options, to choose from, for teaching and learning. These developments force us to rethink about further transformation in the nature of teaching and learning and to re-examine the learning theories and principles, in the emerging e-Learning environments.

Currently e-Learning has become one of the effective alternatives to the distance learners. As a result educators are more interested in applying emerging technology to create new teaching-learning environments to meet the ever-increasing and ever-changing nature of learning needs of the students. It is, thus, the creative use of technology that can enhance the capacity of students to acquire knowledge, skills and value system.

Efforts are also being made to effectively design learning experiences by creating new types of materials to facilitate higher learning. In this context, we attempt to develop an understanding of the concept of e-learning, types of e-learning resources, e-learning tools, digital content creation tools, effective e-learning strategies, e-learning management systems (e-LMS) and learning content management system. We hope you will find the discussion in this Unit interesting and useful in making your teaching-learning more effective so that you can optimally utilize the e-learning experiences and materials.

8.1 OBJECTIVES

After going through this Unit, you should be able to:

- explain the concept and pedagogy of e-learning;
- describe different types of e-learning resources;
- identify digital content creation tools used for developing e-learning resources;
- design e-learning resources;
- discuss the means of delivering e-learning; and
- understand and apply web 2.0 tools for e-learning.

8.2 E-LEARNING: WHAT, WHY AND HOW?

In this section, we will focus on what, why and how of e-learning.

8.2.1 Concept

E-learning is an abbreviation of the term ‘electronic learning’. E-learning literally means the type of learning carried out, facilitated or supported by some or the other electronic gadgets, media or resources. Broadly speaking, e-learning is nothing but learning facilitated by the use of a range of electronic media and technology which include mainframe computers, microphones, listening devices, audio and visual tapes, floppy diskettes, multimedia CD-ROMs, interactive videodisks and advanced ICT.

Today, e-learning is mostly delivered through the internet, although in the past it was delivered using a blend of computer-based methods like CD-ROM.

E-learning offers the ability and facility to share material in all kinds of formats such as videos, slideshows, word documents and PDFs between users, to conduct webinars including live online classes, and to promote effective and real time communication and interaction between distance teachers and learners. (<https://www.talentlms.com/elearning/elearning-101-jan2014-v1.1.pdf>). The variety of media and emerging ICT together provide us diverse ways and means of e-learning such as teleconferencing, audio-conferencing, video-conferencing, computer-based conferencing, e-mail, live chat, surfing on the Internet and Web browsing, online reference libraries, video games, customized online courses, etc.

With the introduction of the computer and internet in the late 20th century, e-learning tools and delivery methods witnessed tremendous expansion. As a result, virtual learning environments began to thrive, with people gaining access to a wealth of online information and e-learning opportunities. Of course, in 21st century M-learning is becoming a means of ubiquitous learning developed and delivered on wireless devices like our cell phones, which offer facility for downloads for off-line learning. E-learning is thus a broader concept than online learning since it encompasses electronic devices and information that are not always dependent or linked to online.

In the emerging ODE context, e-learning refers to utilizing electronic technologies to access educational curriculum outside of a traditional classroom situation. It enables students to access, investigate, analyse, construct and evaluate concepts and ideas encountered in their courses. Currently, in most cases, e-learning is referred to a course, programme or degree delivered completely online via the Internet and the web. It is interactive in nature, delivered live where you can “electronically” interact in real time *synchronously* or sometimes have access to pre-recorded lectures, discussions, etc delivered online *asynchronously*. In such case there is always a distance teacher interacting / communicating with you and grading your participation, your assignments and your performance in tests, etc. E-learning, proven to be a successful method of training and education, is becoming a way of life for many citizens in transnational environment.

The term “e-learning” has only been in existence since 1999, when the word was first used at a computer based training (CBT) systems seminar. Later, other words such as “online learning” and “virtual learning” also came in use in search of and in the efforts to describe e-learning. Some theorists (Kruse, 2002) divide e-learning into three branches: *computer-aided instruction* (CAI), *computer managed instruction* (CMI), and *computer-supported learning resources* (CSLR). CAI includes the portion of the given e-learning product that provides the instruction such as tutorials, simulations, and exercises. CMI refers to the testing, record keeping and study guidance functions of an e-learning product. CSLR includes the communication, databases and performance support aspects of e-learning. Though these branches can be analyzed differently but for us all these refer to parts of the greater whole, i.e. e-learning.

E-learning, according to Paulsen (2003), is as interactive learning in which the learning input/experience/content is available online and provides automatic feedback to the learner’s learning activities. Online communication with real teachers may or may not be included but the focus of e-learning is usually more on learning content than on communication between learners and teachers. E-learning covers a wide set of digital learning applications and processes such as

web-based learning, computer-based learning, virtual classroom, etc. It includes delivery of content via internet, intranet (LAN / WAN), audio and videocassettes, satellite broadcast, interactive television, CD-ROM, etc.

You need to be very clear that e-learning has direct link with open and distance learning (ODL) system. The Open and Distance Learning Quality Council, UK (Ahmed, Hanzala, Saleem and Cane, 2013) defined e-learning as “the effective learning process created by combining digitally delivered content with (learning) support and services”. In this definition you will find that four terms have been used. They are:

- *effective learning*, (there are many types of learning but some may not be effective),
- *combining* (judicious combination of ICT and pedagogy that facilitates learning; it is the combination that makes the difference, not the individual parts),
- *digitally delivered content* (through CDs, cell phones, intranet and internet, it normally excluded paper-based materials) and
- *support services* (that is the learning support provided by tutors, counselors, instructors or course coordinators).

You can thus understand e-learning as a concept that includes all possible media, methods and technology to impart quality education as per the capability and requirements/needs of the learners.

Types of Activities

E-learning happens through undertaking e-learning activities which are either synchronous or asynchronous. In other words, e-learning provides for both synchronous and asynchronous communication (FAO, 2011).

- **Synchronous:** These events or activities take place in real time. Synchronous communication between two people requires both of them to be present at a given time. Examples of synchronous activities are chat conversations and audio/video conferencing. e.g. Chat and Instant Messaging, Video and audio conference, Live webcasting, Application sharing, Whiteboard, Polling, virtual classroom.
- **Asynchronous:** These events or activities are time-independent. A self-paced course is an example of asynchronous e-learning because online learning takes place at any time. E-mail or discussion forums are examples of asynchronous communication tools. e.g. E-mail, Discussion forum, Wiki, Blog, Webcasting.

Here in this context, better you have clarity about online learning or online education as well. As mentioned in Unit-6 (See sub-section 6.3.3.3), e-learning is a sub-set of distance education. Online learning or online education is a sub-set of e-learning, which is explained below.

- **On-line education:** With the world-wide increase in availability of ICTs, the term ‘online’ has become very popular and is closely associated with e-learning. According to Rekkedal and Qvist-Eriksen (2003) e-learning is often used as a synonym for on-line education. It (online education) includes not only delivery of contents via Internet, intranet/extranet (LAN/WAN) and

world wide web but also audio and video tapes, satellite broadcasts, interactive TV and CD-ROM. It allows access to course materials, assignments, reference materials, contact sessions, etc online and permits interaction through a full range of interactive methodologies based on effective instructional design and the use of computers and other means of electronic or telecommunications. Through a range of online learning technologies, we can engage predominantly in synchronous (real-time) communication, with fellow students and teachers through networked computer and asynchronous interaction across space, time, place and pace. Online education thus provides greater freedom/flexibility in study and help in accommodating learners' other personal, social and official/business commitments. MIT OpenCourseWare, edX, Udacity and Codecademy are some e-learning sites that offer online open courses.

Online learning and web-based learning (WBL) are sometimes used interchangeably. WBL is a computer-based learning in which the learning material is presented on pages accessible through World Wide Web (www). Typical media used are text, graphics, animation, audio and video. Of late e-learning is referred to technology-based learning, focusing on web-based delivery method. In this context, it is also important for you to know the difference between Internet and the Web (World Wide Web, www). This is essential because many people use the terms Internet and World Wide Web interchangeably, though in fact the two terms are separate and not synonymous, yet closely interrelated.

Difference between Internet and Web

The Internet and the Web are two different things. The **Internet** is a massive *network of networks*, a networking infrastructure (hard and soft). It connects millions of computers together globally, forming a network in which *any computer can communicate with any other computer* as long as they are both connected to the Internet. Information that travels over the Internet does so via a variety of languages known as *protocols*. The **World Wide Web**, or simply Web, is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. The Web uses the HTTP protocol, only one of the languages spoken over the Internet, to transmit data. The Web also utilizes *Internet browsers* such as *Internet Explorer* or *Google chrome* or *Firefox* to access Web documents called Web pages that are linked to each other via hyperlinks. Web documents also contain graphics, sounds, text and videos. The Web is just one of the ways that information can be disseminated over the Internet. The Internet, not the Web, is also used for email, Usenet news groups, instant messaging and file transfer protocol, i.e. FTP (Vangie Beal, See [www.webopedia.com/ DidYouKnow/Internet/Web_vs_Internet.asp](http://www.webopedia.com/DidYouKnow/Internet/Web_vs_Internet.asp)). To conclude, the Web is not a network. It is not the Internet itself. It is a system of clients (web browsers) and servers that use the Internet for its data exchange.

Of late, both the Internet and the Web are used as essential components of e-learning. E-learning thus represents a new paradigm of learning — a cognitive/constructivist approach which encourages the construction of new knowledge structures and avenues for their use. This type of learning takes place in a highly interactive environment with feedback from the teacher and fellow learners.

With this clarity of the concept of e-learning, we will now discuss e-pedagogy and design process.

8.2.2 E-Pedagogy and Design Process

Pedagogy focuses on enabling learning and intellectual growth of students in contrast to instruction that treats students as the objects ready to take instructions of curriculum implementation. Successful pedagogy requires teachers to understand how students learn and exercise their autonomy to design, develop, implement and assess educational activities that meet individual and collective needs of learners.

E-Pedagogy

E-pedagogy might broadly be defined as ‘learning design that incorporates educational quality, values and effectiveness of teaching, learning and assessment activities supported by technology’. While one might argue against a separation of e-pedagogy from any other pedagogy research and evaluation literature suggests that new modes of teaching and learning are emerging through the use of online networks, access to remote experts and, more recently, mobile technologies (Bilali, Bushati, Dibra and Barroli, 2013 at hrcak.srce.hr/file/179404).

E-learning pedagogy or pedagogy of e-learning represents instructional activities that promote active student learning in the context of e-learning. It will focus on the exploitation of information technologies to adapt to the varying learning scenarios and diverse student needs (http://www.itdl.org/journal/may_06/article01.htm). With the emergence of e-learning, it has become common to use the terms ‘e-pedagogy’, ‘e-learning pedagogy’ or ‘pedagogy of e-learning’ synonymously. However some differ with such usage, with nuances of their own arguments (Mehanna, 2004; see <http://www.aabri.com/HC2014Manuscripts/HC14024.pdf>), which, in this context, is not much significant to focus upon.

Nevertheless, fact is that, consistent theory of online education is lacking, without which there is no quality teaching and learning. It such a theory is required to provide: a) the conceptual base for the expectations of a pedagogically sound, effective design for planning and implementing both online teaching and learning; b) with a setting that will help understand online students and their learning process; c) a framework with a set of methodological directions and advice to prepare both online teachers, instructors, tutors, etc for effective teaching and help them maintain their professionalism, and learners for their effective learning.

Instructional Design Process

You have already understood the instructional design (process) in the context of SLMs or SLPs in Unit-5. That makes you easy to understand here the instructional design process in e-learning as well.

One of the biggest challenges faced by e-learning experts is the lack of relevant e-content in the digitized or electronic form. Gupta (2006) argues that management of content, making it available to a number of learners, understanding the intellectual issues of the content and finding out the most relevant learning content to be in line with the course objectives are some of the challenges that need to be addressed. He further argues that there is a need to develop standards/criteria based on which the relevant e-learning content can be developed. In addition, guidelines need to be prepared to help the policy planners and practitioners to evaluate the quality content, in order to ensure that it meets the pre-defined course objectives.

The instructional design depends on the theories and principles of learning. While learning theories are the backbone of any instructional design, the latter optimizes the learning outcomes. Similarly, instructional design to develop e-learning combines learning theories, e-learning experience, technological innovation and visualization of the outcomes. Regarding implications of learning theories for designing e-learning materials, Becta (2006) suggest that:

- Learners should know why they are learning something and what they can expect to achieve once they have completed the learning experience. That is, they should know the aims and objectives of e-learning materials.
- The materials should be appropriate to the learning and training needs of the learners.
- The materials should be motivating and interactive: exciting the learner into wanting to learn.
- The assessment of learning should directly involve the learner.

Like learning depends upon instructional design, e-learning also depends upon its design. The e-learning system is process-oriented, encouraging learners to reflect on and evaluate their own learning experiences. It is based around a series of diverse activities, providing a scaffold of learning (Attwell, 2005). As such the programme is highly structured but is learner-oriented; learners' own experiences provide them raw materials for learning. Attwell suggests the following steps for developing of e-learning, based on the seven challenges of e-learning design. Let us discuss these steps in brief.

- Defining objectives:*** E-learning objectives should be specified with the standard the learners are expected to achieve. The objectives should be clear, realistic and challenging for the learners. Setting of learning outcomes in terms of knowledge, skills and behaviours form the first and foremost step in the instructional design process.
- Basing e-learning on learners' own experiences:*** For setting the learning outcomes, you should have sound knowledge of the learning needs, characteristics and experiences of the learners. This is a major challenge, because you need to have fair idea of their pre-requisites and experiences, their attitudes towards the course content, their learning/study skills, etc., so that the learning materials are designed around these factors. Proper assessment of their prior experiences about the content of e-learning courses will enable you to make learning input relevant and specific to their needs, experiences and expectations which will also help the learners to reflect upon the outcomes and do self-evaluation of the experiences.
- Creating Learning environment:*** You have to think of different ways and means of developing an interesting, interactive and powerful learning environment so that e-learning does not become boring and monotonous exercise. The learning content should be based on real life situations/experiences and should be supported by examples, illustrations, case studies, diagrams, games, animation and so on. The learning materials should present relevant activities to help the learners master knowledge and skills, and to demonstrate the extent to which they have mastered the knowledge and the skills. Only those learning experiences should be selected which can make

learning challenging and make students think on their own. The video can form a dynamic component and also provide learning material a multimedia form. You need to think of problem formulation and problem-solving strategies which will promote reflective-thinking and innovation among the learners. The learner should control the process of learning so that s/he gets intrinsic motivation to sustain and reinforce acquisition of relevant knowledge and skills.

- iv) ***Supporting e-learning:*** The learners have different social, economic, cultural and educational backgrounds, and have differing learning styles. The learning opportunities need to be self-paced to fit in with the schedules of learners and allow them to progress at different speeds depending on their learning needs and the availability of time. The fact is that one format may not suit all learners. The e-learning material and activities should allow learners to be flexible and engage in different ways to suit their needs and schedules. The e-learning system should therefore support each individual learner accordingly.
- v) ***Developing dynamic and sustainable content:*** The e-learning process should support development of dynamic content. It should facilitate incorporation of changes and to adopt the content to emerging learning/training needs and ideas. The feedback from the learners should be part of the learning input to be offered in future courses. The revision, adaptation and extension should be a continuous process.
- vi) ***Developing flexible modes of delivery:*** As we know, the learners come from different backgrounds, and hence have different learning styles and strategies. Some may wish to have purely online learning, with or without teacher support. Other learners may prefer to use the e-learning materials as support for face-to-face contact. So the e-learning materials should be developed in such a way that these can be implemented through different modes of delivery and hence satisfy the needs of the individual learners.
- vii) ***Recording, validating and presenting learning:*** The learners' academic achievement should be recorded and accredited to the learner's account. Some learners pursue their study for knowledge sake while others are more reflective and desire to develop their expertise in a particular subject area so that they can professionally grow. Based on their learning inputs of knowledge, skills, and behaviours developed as a result of going through the e-learning materials, activities/experiences the learners could be awarded a certificate, diploma or degree accordingly.

Instructional design is just a part of e-learning strategy of your institutional setting. A successful e-learning strategy relies on the interconnectedness of five main elements — Tools, People, Training, Supports, and Processes (Young, 2007). It calls for identification of different tools required and the people to be involved, training them, providing them all the support required and putting all the processes and related guidelines in place. You have to follow an effective strategy that can integrate all these key elements in designing, developing and delivering e-learning through different e-learning resources.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

- 1) Explain the concept of E-learning and its significance in open and distance education.

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8.3 TYPES OF E-LEARNING RESOURCES

E-Resources are vital sources of e-learning. Digital technology, when applied to the stored intellect, has made the task very easy, speedy and comfortable. The information collected through the ages can be effectively used for further research, betterment and overall development of the society. Now, e-resources or e-learning resources are easily accessible even in remote areas. E-resources also solve storage problems and control the flood of information.

Digitization is the process of transforming text, sound, images or motion picture from analog form (a continuous stream of data that we can see or hear) into digital form (a series of binary data based on a sampling process) that we can save, organize, retrieve, and restore through electronic devices into perceptible surrogates of the original works. Of the vast number of digital assets that are being created, still images, texts, motion pictures, and sound recordings predominate (<https://www.bowdoin.edu/dam/audio/>). Digitization also brings with it the tremendous benefit of “random filing,” since we no longer have the worries that come with maintaining manual, physical files that are necessary for storing audio/sound files in material form. Further, these characteristics require us to alter how we approach browsing visual, audio and video materials in digital form.

E-learning resources are mainly available in three forms or types – digital print, digital audio and digital video. Having a range of resources in e-learning makes the content more diverse and interesting and can provide practical examples of different material. We will briefly discuss these types below.

8.3.1 Digital Print

With growing utilization of digital technology, there is a trend emerging to digitalise the print sources. The more prominent among them is the e-resources in digital print form, which are made available online. These electronic information sources are becoming more and more important for the academic community. The advent of technology has made the libraries to add these new

forms to its collection, though there is an emergence of separate digital libraries. Important among the digital print forms include:

- Web Sites - Open Access, Full-Text and Bibliographic
- E- Books, Journals and Articles
- E-theses and e-dissertations
- E-dictionaries and references
- E-catalogues
- E-Archives and Research repositories
- Data Files
- E-encyclopedias
- Guide books and Handbooks
- Others

Wide variety of these e-resources, thus available in digitalized print form, help you learn the content sitting at the desktop or having a mobile in hand and with access to Internet facility. These forms of e-resources can also provide you information from outside sources such as links to many other websites including online library catalogues so that you can gain a broader understanding of the same through wider access to the content from multiple perspectives.

8.3.2 Digital Audio

Digital audio refers to the reproduction and transmission of sound stored in a *digital format*. This includes CDs as well as any sound files stored on a computer. In contrast, the telephone system (but not ISDN) is based on an *analog* representation of sound. In sound recording and reproduction systems, digital audio refers to a *digital representation* of the audio waveform for processing, storage or transmission. When analog sound waves are stored in digital form, each digital audio file can be decomposed into a series of samples (http://www.webopedia.com/TERM/D/digital_audio.html). Some other forms include online presentations, Webinars and Podcasts.

Digital audio fundamentally differs from its analog counterpart (cassette tape) because it reveals no meaning without availability of the software and hardware that translate and render it as sound. Digital audio is the sound that has been created through the process of digitization. Sometimes, digital audio is created through digital recording, conversion, or is acquired through a third party (e.g., via e-mail attachment, purchase or license, downloading from the Web, etc). (<https://www.bowdoin.edu/dam/audio/>).

8.3.3 Digital Video

Unlike traditional analog video, which is captured frame by frame on a tape, digital video is recorded digitally. *Analog video* represents moving visual images with *analog signals* while digital video is a representation of moving visual images in the form of encoded *digital data*. An analog video such as a *motion picture film* uses a series of photographs which are projected in rapid succession while *digital video* comprises a series *digital images* displayed in rapid succession. Since digital video is stored in a digital format, it can be recognized

and edited by a computer, which is also a digital device. *Digital video* thus refers to the capturing, manipulation and storage of *video in digital formats*. A digital video (DV), camcorder for example, is a video camera that captures and stores images on a digital medium (<http://techterms.com/definition/dv>; & http://www.webopedia.com/TERM/D/digital_video.html).

Digital video can be copied with no degradation in quality. In contrast, when analog sources are copied, they experience generation loss. Digital video can also be stored on hard disks or streamed over the Internet to end users who watch content on a desktop computer screen or a digital Smart TV. In everyday practice, digital video content such as TV shows and movies also includes a digital audio soundtrack (https://en.wikipedia.org/wiki/Digital_video).

8.3.4 Web-based Resources

Web resources or web-based resources include Web-based applications or services that are accessed using HTTP or HTTPS. Web-based resources encompass every ‘thing’ or ‘entity’ that can be identified, named, addressed, accessed or handled, in any way whatsoever, in the web at large, or in any networked information system. Examples include: Microsoft Outlook Web Access and other Web-based email programs, Web portals, corporate intranets, and standard Web servers.

You also need to know whether a native app and web-based app is one and the same. “A *native app* is one that is built for a specific platform, such as iPhone or Android, using their code libraries and accessing their available hardware features (camera, GPS, etc). A *web-based app*, on the other hand, is one that is hosted on the web and accessed from a browser on the mobile device (<https://uxmag.com/articles/native-or-web-based-selecting-the-right-approach-for-your-mobile-app>).

As far as distance education is concerned, there are two major types of Web resources – information for research, and interactive applications for teaching and learning.

Characteristics of Web-based Resources

Unlike printed self-learning materials which are linear in design, Web-based materials are basically non-linear in design, because on the WWW you can create all kinds and ways of accessing information through search engines, URLs, menu-bars, hyperlinks and other navigational methods. Interaction with tutors and peer group and even others having similar interests can be as frequent as desired through email, chat sessions, computer conferencing, newsgroups, etc.

Web-based materials have the following characteristics:

- ***Non-linear instruction:*** Provides sufficient hyperlinks to enable learners to interact with the materials in a non-linear manner to supplement the knowledge being provided through the course.
- ***Collaborative activities (team work):*** Offers opportunities for active participation in the learning process and active articulation and organization of ideas through discussion forums, collaborative activities etc.
- ***Access:*** Provides temporal access, 24 hours/day, 7 days/week transcending gender, age, race, physical as well as socio-economic barriers.

- **Active learning:** Systematically organized sequenced content is presented attractively using graphics, audio files, video files, animation, flow charts, etc.
- **Multiple perspectives:** Content presented is culturally unbiased and objective and is applicable to different learners according to their knowledge base.
- **Problem solving approach:** Tasks (assessments) which are similar to real world activities and problems or questions which would make learners construct their own knowledge.
- **Web based learner support:** Provision of Web based tutors should be there to provide the necessary support and guidance; and other Computer Mediated Communications (CMCs) such as chat rooms, discussion forum, notice boards, etc.

Significance of digital literacy in e-learning

Digital literacy has become part of our lives. We easily navigate on the web, searching for articles and videos, and sharing information with our friends. These tasks seem easy; however they are not that easy for everyone. There are still many people for whom the web is a confusing, dark space. Digital skills should be part of education to ensure that every student, independent from age and background, can equally participate and benefit from the infinite knowledge of the web (<https://elearningindustry.com/digital-literacy-critical-elearning>). Lack of digital literacy is thus one of the major limitations in exploiting the web-based resources.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

2) What are the types of E-learning resources?

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8.4 DIGITAL CONTENT CREATION TOOLS

Development of e-learning content is essentially dependent upon the availability and utilization of a variety of software called digital content creation tools. These are the technological resources used to design the digital content. They are of different types and serve varied purposes in creation of digital content. Digital content becomes integral part of these tools, since without these tools the digital content has no existence. In other words, the digital content creation tools are, in

fact, the software into which the desired content is put. And, some tools help in improvement of the quality of digital content. Different tools are appropriate for creation of different digital content. In this section, an attempt is made to present you with a wide range of digital content creation tools that are useful for developing e-learning content of different types. Of course, some of these tools may be free versions while others may be paid versions and some may be of both the versions providing for varying options to users.

8.4.1 Visual Content Creation Tools

Visual content creation tools are useful in creating attractive and interesting visual content in digital form. There exist a number of tools useful to varied people ranging from beginners to the expert users involved in content creation. These tools will help you in performing different tasks while writing, creating or developing the visual content. Different tools serve different purposes while some serve multiple purposes. Thus, different tools will help you in performing different purposes; some tools may help you perform many functions. Given below are some of the widely available tools along with their websites which you will find useful to choose from for visual content creation and editing.

- **Tools for Keyword Analysis:** For example, Keyword Finder (kwfinder.com); Keywordtool.io (keywordtool.io); Keyword Discovery (www.keyworddiscovery.com); Wordstream (www.wordstream.com/keywords); Google Trends (www.google.com/trends); Serpstat (serpstat.com); Ubersuggest (ubersuggest.io); Google Webmaster Tools (<https://www.google.com/webmasters>).
- **Content Generation Tools:** For example, Canva (www.canva.com); Content Idea Generator (www.portent.com/tools/title-maker); BuzzFeed (www.buzzfeed.com/tools); Coschedule Headline analyser (coschedule.com/headline-analyzer); HubSpot's Blog Topic Generator (www.hubspot.com/blog-topic-generator); Tweak Your Biz (tweakyourbiz.com).
- **Content Analysis Tools:** For example, BuzzSumo (buzzsumo.com); Venngage (venngage.com); Evernote (evernote.com); WordCounter (wordcounter.net & www.wordcounttool.com).
- **Text Editing, Content Readability, Testing and Quality Check Tools:** For example, MarkdownPad (markdownpad.com); Grammarly (www.grammarly.com); Whitesmoke (www.whitesmoke.com); Online correction (www.onlinecorrection.com); Languagetool (www.languagetool.org); Online Editor (www.grammarcheck.net/editor); Online text correction (www.textcorrection.com); Spell Check (www.gingersoftware.com/spellcheck); Paperrater (www.paperrater.com); Grammar and spell check (www.gingersoftware.com/spellcheck); Gingersoftware (www.gingersoftware.com/grammarcheck); Headline Analyzer (www.teachingblogtraffic.school.com/free-headline-analyzer-too); Editorially (beautifulpixels.com/web/editorially-write-collaborative-editor-online); Correctica (correctica.com); Hemingway App (www.hemingwayapp.com).
- **Data analytics and Infographics tools:** For example, Percentage Change Calculator (percent-change.com); 3-Way Percentage Calculator ([111](http://3-way-

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percentage-calculator.software.informer.com); Conversion Rate Calculator (<http://www.xe.com/currencyconverter/>); Piktochart (piktochart.com); Timeline JS (timeline.knightlab.com); Infogr.am (infogr.am); Annie Cushing's Must-Have Tools (www.annielytics.com).

- **Duplicate Content (Plagiarism) Checkers:** For example, Grammarly (www.grammarly.com); Copyscape (www.copyscape.com); Duplichecker (www.duplichecker.com); Plagiarisma.Net (plagiarisma.net); Plagiarism Software (www.plagiarismsoftware.net); Plagspotter (www.plagspotter.com).

8.4.2 Image Sourcing, Creating, Editing and Uploading Tools

In order to make your digital content more appealing, you may like to enrich the content with appropriate images or photos. Finding right images or photos from among those existing and freely available for use must be preferred to save your time, energy and effort, unless it is especially required or warranted for such purpose. By using these tools, sometimes you can also attempt to create the images of different types, particularly of your choice, and enrich the resource in these tools for viewing and using by others. These tools may provide you vast diversity of images or photos of various living and non-living things and innovative images of all kinds created by the resource users/producers. These tools may include: Caption Free Images, Searchable Photo Stock, Free Photo Collection and Photo search tools, among others. Some of these tools, as examples, are mentioned below.

- **Caption Free Images tools:** For example, Plash, Death to the Stock Photo (deathtothestockphoto.com), New Old Stock (nos.twinsnd.co), Picjumbo (picjumbo.com), The Pattern Library (thepatternlibrary.com), Getrefe (getrefe.com), IM Free (imcreator.com/free), Jay Mantri (jaymantri.com), Public Domain Archive (publicdomainarchive.com/), Magdeleine (magdeleine.co), Foodiesfeed (foodiesfeed.com), Picography (picography.co), Raumrot (raumrot.com), ISO Republic (isorepublic.com).
- **Searchable Photo Stock tools:** For example, Dreamstime (www.dreamstime.com), Free Digital Photos (www.freedigitalphotos.net), Free Images (www.freeimages.com), Free Range Stock (freerangestock.com), Free Photos Bank (www.freephotosbank.com), Image Free (www.imagefree.com), Morguefile (morguefile.com), Pixabay (pixabay.com), Public Domain Pictures (www.publicdomainpictures.net), Stockvault Free Stock Photos (www.stockvault.net), Rgbstock Free Stock Photos (www.rgbstock.com).
- **Free Photo Collection tools:** For example, Ancestry Images (www.ancestryimages.com), BigFoto (www.bigfoto.com), Gratisography (gratisography.com), FreeMediaGoo (www.freemediagoo.com/), Hubspot (www.hubspot.com), iStock (www.istockphoto.com/in), Little Visuals (littlevisuals.co), Pickupimage (pickupimage.com), Superfamous Images (images.superfamous.com), Unsplash (unsplash.com), Wikimedia Commons (commons.wikimedia.org).
- **Photo Search tools:** For example, Can We Image (canweimage.com), Compfight (compfight.com), Creative Commons Search (www.creativecommons.org), Foter (foter.com), Google Advanced Image Search

(www.google.co.in/advanced_image_search), Every Stock Photo (www.everystockphoto.com), PhotoPin (photopin.com), TinEye (www.tineye.com).

- **Image Design tools:** Canva (www.canva.com), PicMonkey (www.picmonkey.com).
- **Logo Maker tools:** LogoGarden (www.logogarden.com), LogotypeMaker (logotypemaker.com), Free Logo Maker (logomakr.com), DesignMantic.com (www.designmantic.com).
- **Photo Editing tools:** Photoshop (www.adobe.com/Photoshop), BeFunky (www.befunky.com), Pixelmator (www.pixelmator.com).

8.4.3 Interactive Content Creation Tools

Even if you have made your digital content rich enough with good text and images/photos, you may like to add some interactive content to make the teaching-learning activity more dynamic, interesting and effective. You may think of making e-learning content interactive in diverse ways. Depending upon the nature of the content and suitability of the tool(s) you can use them appropriately for the intended effect/purpose.

Some of the tools that will be useful for you to make the learning content more interactive include: Qzr (www.qzr.com); SnapApp (www.snapapp.com); Guides.co (guides.co); Apester (apester.com); Zaption (www.zaption.com); WebyClip (webyclip.com); Mapme (mapme.com); Brackify (brackify.com); Polldaddy (polldaddy.com/features); PlayBuzz (www.playbuzz.com); Votion (www.votion.co); Zembula (www.zembula.com); ThingLink (www.thinglink.com); Infogr.Am (infoagr.am); RooJoom (www.roojoom.com); Compfight (compfight.com).

8.4.4 Infographic and Chart Maker Tools

If you have such content which is required to be presented in the form of graphs and charts you need to use infographic and chart maker tools. For example, you can use the tools like the following, among others, for such purposes: Venngage (venngage.com); Infogr.am (infoagr.am); Infoactive (infoactive.co).

8.4.5 PowerPoint Presentation Tools

If you want to help the learners focus on the message and create a collaborative environment you can share the information with them very easily and also equally help those who fail to attend the original presentation for any reason, PowerPoint presentation is very useful for both the teacher and the learners. PowerPoint presentations can also help ease your anxiety while speaking by focusing the audience's attention on the slides, text and images. There are many PowerPoint presentation tools. Some of these tools, for example, are: *Microsoft PowerPoint* (microsoft-powerpoint-2010.jaleco.com), PowToon (www.powtoon.com), Google Slides (www.google.com/slides/about), SlideDog (slidedog.com), SlideShare (www.slideshare.net), SlideRocket (www.sliderocket.com), Prezi (prezi.com), AuthorSTREAM (www.authorstream.com), Haiku Deck (www.haikudeck.com).

8.4.6 Audio Creation Tools

Effective audios will help keep the students actively involved in learning. There are multitude of ways in which you can incorporate audio into the learning process and it is possible through a variety of tools available for this purpose. Some of these tools useful in this regard include: Vocaroo (vocaroo.com); UJAM (www.ujam.com); Incredibox (www.incredibox.com); Audacity®(www.audacityteam.org); Coffitivity (coffitivity.com).

8.4.7 Video Creation Tools

Video creation tools will help you use stock media clips or produce, trim and upload your own videos. Some of the popular video creation tools, among others, include: Animoto (animoto.com), GoAnimate (goanimate.com), Powtoon (www.powtoon.com), Sellamations (sellamations.com), VideoScribe (www.videoscribe.co), Evaer (www.evaer.com), Call Recorder *for Skype* (www.ecamm.com/mac/callrecorder), Google Hangouts on Air (support.google.com), Camtasia (discover.techsmith.com), ScreenFlow (screenflow.en.softonic.com/mac).

8.4.8 Media Integration Tools

You can use media integration tools for integrating the visual, audio and video contents or components. These tools are also useful for delivering support across multiple media/channels such as the web, social, phone, email, mobile and live chat, among others. Some of these tools, for example, include: Chirbit (www.chirbit.com); Meme Generator (memegenerator.net); Evernote (evernote.com); Polldaddy (polldaddy.com).

8.4.9 Tools for Writing for the Web

There are a number of online tools for writers of all types. These tools are useful to those who are new to the world of authorship and also to those who are veterans trying to make significant contribution to most of Web services and applications. These tools will help you learn about optimizing your content for the Web — from blogging platforms to networking hotbeds, from job boards to real-world gatherings. These tools, for example, include: Mou (www.mou-online.com); Clipboard Cleaner (play.google.com/store/apps/details?id=com.kodholken.clipboardcleaner&hl=en); Word2CleanHTML (word2cleanhtml.com); Storify (storify.com); Google Fonts (fonts.google.com); PlaceIt (placeit.net); Word2cleanhtml (word2cleanhtml.com).

The tools mentioned under sub-sections 8.4.1 to 8.4.9 above are just a few examples only and are not exhaustive. However, we believe that the above information on different tools would have given you a broad idea of a variety of tools that exist for digital content creation. In this section you have thus known various types of digital content creation tools. You may note that, no one tool may be adequate enough by itself to create comprehensive digital content. Creation of effective digital content calls for utilization of diverse tools. The tools mentioned above serve different purposes. Each tool might have its unique quality and feature. The tool you wish to use must be relevant, organic, and valuable to your purpose as well as that of the students or the audience, as the case may be.

You can therefore try all the relevant tools, from among those mentioned above, to get practical experience of their working or usefulness for your content creation tasks. So you can make use of these tools and save your time in digital content creation. Hope you can create and publish your dream content.

8.5 DELIVERING E-LEARNING

You may recall that in sub-section 8.2.2 of Section 8.2 above, we talked about “Supporting e-learning” as one of the key elements of e-learning design. E-learning must therefore adopt to the changing needs and times of the target group. Delivery of e-learning is done by ensuring support through web-based software application known as Learner Management System (LMS). Hence, some call it eLMS since it is basically web-based application programme (Stacey, 2001). Some educators use the term Learning Content Management System (LCMS) software as a close cousin of LMS (Kruse, 2002); though there exist a difference between them, i.e. while the former software (i.e. LCMS) is used to author and manage learning content the latter software platform (i.e. LMS) is used to deliver and track courses. In fact, the LMS (or eLMS) is a highly visible, major investment in the e-learning initiative.

In this section, we will discuss LMS and LCMS briefly, to give you an idea of both of them. Let us look at this support as a part of delivery of e-learning.

8.5.1 Learning Management System

LMS is a global term for a computer system (software) specifically developed for managing online courses, distributing course materials and allowing collaboration between students and teachers. A LMS will allow you to manage every aspect of a course, from the registration of students to the storing of test results, as well as allow you to accept assignments digitally and keep in touch with your students. In essence, the LMS is the backbone of most e-learning activities. LMSs are built on various platforms, commonly PHP, .Net or Java and they will hook up to a database such as 35 PostgreSQL, MySQL or SQL Server. LMSs do vary in the features they offer, but most systems are likely to have some or all of the following features: Easy GUI (GUI stands for Graphical User Interface). Customization, Enrollment, Virtual Classroom, Social Networking, Communication, Course pathways, Reports, Help with content creation, and Testing (Epignosis, 2014; at <https://www.talentlms.com/elearning/elearning-101-jan2014-v1.1.pdf>). There are many LMSs out there, both commercial and free systems i.e. open source software. For example, Moodle is a free and open source e-learning software platform also known as Course Management System, Learning Management System or Virtual Learning Environment (Ahmed, Hanzala, Saleem and Cane, 2013). LMS plays a key role in the success of e-Learning.

LMS is a software for planning, organizing, implementing and controlling the learning process. Any institution offering e-learning / online courses, therefore, organizes, implements and controls various aspects of learner support — teaching, advising, counselling, library services, technical assistance, administrative services, etc — through an LMS. The institution providing e-learning is required to manage the entire learning process through LMS. LMS is a broad term, which is used for a wide range of systems that organize and provide access to online

learning services for students, teachers, and educational administrators. These services usually include access control, provision of learning content, communication tools and administration of learners. LMS is a fully integrated e-learning administration system that facilitates the administration of learner and course, and monitoring of the learning process quickly and efficiently. It enables the delivery, management and administration of a range of learning activities, services, content and data.

The LMS/e-LMS ensures that the e-learning material is delivered to the learners and movement of submission and assessment of assignments, etc are monitored. The institution has to ensure effective integration of all elements: human and physical resources, associated with e-learning. e-LMS performs the following functions (Stacey, 2001):

- Schedules and register learners into online and offline courses.
- Keeps learner profile data.
- Launches e-learning courses.
- Tracks learner progress through the course.
- Manages classroom-based learning.
- Provides learning administrators with ability to manage resources including labs and classroom (resource management).
- Supports learner collaboration.
- Creates test questions and administers the test.
- Reports performance/learning.
- Builds interconnectivity with virtual classroom.

Using an LMS, learners select courses, receive content, complete exercises, quizzes, etc and also communicate with instructors and other peer learners. Instructors, administrators and managers monitor learner participation through records contained in an LMS. In other words, LMS supports the students at every stage of their learning and assessment. It also provides for cost saving, control over educational activities, improvement in the speed and effectiveness of educational process and improvement in communication among learners. The emerging view with the educational institutions seems to be that an LMS is a critical tool in the management and development of human resources and a mechanism for improving the status of learning and training process. In other words, LMS is a comprehensive delivery system, designed to provide efficient tools for creating electronic lesson plans, class assignments, tests, ability to use interactive features such as threaded discussions, video conferencing, discussion forums, etc and also for tracking the progress of individual students in a course including its completion.

8.5.2 Learning Content Management Systems (LCMS)

Some educators use the term Learning Content Management System (LCMS) as a close cousin of LMS (Kruse, 2002). An LCMS manages and delivers personalized content reducing the learner's time to acquire proficiency in learning/training, thus resulting in increased organizational productivity. LCMS is primarily responsible for creating, managing, maintaining, delivering and tracking web-

based content. An LCMS is meant for content developers, instructional designers, and learning managers providing primary management of learning content. It performs the following functions (Stacey, 2001):

- Content creation tools
- Workflow tools to manage content development process
- Learning object repository
- Organizing reusable content
- Content reuse and adaptive individualized learning path based on learning objects
- Asynchronous collaborative learning including discussion groups
- Testing, and certification
- Reporting of results
- Delivery of content in multiple formats (online, print, CD-ROM, etc.)
- Providing content navigational control (look and feel)
- Interconnectivity with virtual classroom, LMS, learning enterprises, etc.

Based on the functions listed above we can say that LMS and LCMS complement each other. An LMS and LCMS can be integrated and information from the two systems can be exchanged. In addition, both the LMS and the LCMS can interconnect with other enterprise applications making e-learning an integral part of the whole enterprise.

The most frequently listed LMS tools that have performed inter-operability tests with LCMS tools, and good examples of products that clearly fit the LMS space includes (<http://www.productivity.corn/LMS/brandonhallimsyslms.doc>; and Young, 2007), for example:

- Saba Enterprise – <http://www.saba.com>
- Click2Learn (click2learn.pk);
- THINQ Training Server (www.kmsi.us/thinq_solution.htm)
- Learning Space (<http://learningspacetoolkit.org>)
- TopClass (www.classtools.net)
- Plateau LMS – <http://www.plateau.com>
- SumTotal Systems Total LMS – <http://www.sumtotalsystems.com>
- EEDO ForceTen LCMS – <http://www.eedo.com>
- GeoLearning GeoMaestro – <http://www.geolearning.com>
- Learn.com LearnCenter – <http://www.learn.com>
- OLAT – <http://www.olat.org/public/index.html>
- Ganesha – <http://savannah.nongnu.org/projects/ganesha>
- Ilias – <http://www.ilias.de/ios/index-e.html>

You should make sure to review the features, functionality and cost of the various options of the market as well as your ability to refine and customize the solution

to meet the organizational needs. You need to ensure that you are choosing the best option to support your e-learning strategy.

Check Your Progress

- Notes:** a) Space given below the question is for writing your answer.
b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

3) What is Learning Management System (LMS)?

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8.6 E-LEARNING THROUGH WEB 2.0 TOOLS

By now you have understood that the WWW or simply the Web provides the users with a uniform and convenient means of accessing vast resources through the Internet. The Web is an information sharing model built on top of the Internet. The Web uses the HTTP, one of the languages of the Internet, to transmit data. The Web is a huge collection of documents called web pages that are linked to each other via hyperlinks. Web documents contain text, graphics, sounds, video, etc which can be accessed with a web browser. Search engines are used to search for documents and files on the Web, usually on similar or related subjects. The Web offers an amazingly quick way to access information and is the richest storehouse of information in the world. What is Web 2.0 or Web 2.0 tools?

8.6.1 Web 2.0 Tools: The Concept

Web 2.0 is about revolutionary ways of creating, collaborating, editing and sharing user-generated content online. It is also about ease of use — technology has never been easier or more accessible to all. It is all possible because of web 2.0 tools. These tools are internet tools that allow the user to go beyond just receiving information through the web. Web tools can be used to enhance teaching and collaboration among teachers and students as well as increase professional collaboration between educators.

A Web 2.0 site may allow users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community, in contrast to Web sites where people are limited to the passive viewing of content. Examples of Web 2.0 include social networking sites, blogs, wikis, folksonomies, video sharing sites, hosted services, Web

applications, and mashups (https://en.wikipedia.org/wiki/Web_2.0). The user is expected to interact and to create content with others.

8.6.2 Blogs

What is a blog? Short for *Web log*, a blog is a Web page that serves as a publicly accessible personal journal for an individual. It has defined owner or leader or author. Typically updated daily, blogs often reflect the personality of the author. (<http://www.webopedia.com/TERM/B/blog.html>). Bloggers can usually use a number of services for the updates including instant messaging, e-mail, Twitter, etc. The posts are called *microposts*, while the act of using these services to update your blog is called *microblogging*. Social networking sites, like Facebook, also use a microblogging feature in profiles.

8.6.3 Wiki

Wiki is a server software that allows users to freely create and edit Web page content using any Web browser. A wiki is a website that provides collaborative modification of its content and structure directly from the web browser. A wiki is run using wiki software, otherwise known as a wiki engine. There are dozens of different wiki engines in use, both standalone and part of other software, such as bug tracking systems. Some wiki engines are open source, whereas others are proprietary. Some permit control over different functions (levels of access); for example, editing rights may permit changing, adding or removing material. Others may permit access without enforcing access control.

A defining characteristic of wiki technology is the ease with which pages can be created and updated. Wiki supports hyperlinks and has a simple text syntax for creating new pages and cross links between internal pages on the fly. In a typical wiki, text is written using a simplified markup language (known as “wiki markup”), and often edited with the help of a rich-text editor. A wiki engine is a type of content management system, but it differs from most other such systems, including blog software, in that the content is created without any defined owner or leader, and wikis have little implicit structure, allowing structure to emerge according to the needs of the users.

Wikimedia is the collective name for the Wikimedia movement, revolving around a group of inter-related projects, including Wikipedia, Wiktionary, Wikiquote and others, which aim to use the collaborative power of the Internet, and the *wiki* concept, to create and share free knowledge of all kinds.

8.6.4 Social Networking

The term “Social networking” represents a wide range of internet-based software that facilitates the users to make and promote connections with their friends, family, classmates, customers and clients. Social networking is also a significant target area for marketers seeking to engage users. Social networking can occur for social purposes or business purposes or for both through sites or services. A *social networking site* or *social networking service* (abbreviated as SNS), is the phrase used to describe any Web site that enables users to create public profiles within that Web site and form relationships with other users of the same Web site who access their profile. SNS is collectively called social media.

Social network sites or services are very diverse and incorporate new information and communication tools such as mobile connectivity, and allow users to share ideas, pictures, posts, photos, video, activities, events, and interests with people in their network. The unparalleled potential of the Web has been fully recognized and exploited now with social networking having gone almost as long as societies themselves have existed, through Web-based groups established for that purpose. Social media is a platform to build social networks or social relations among people who share similar personal and career interests, activities, backgrounds or real-life connections.

Social networking services are a type of Web 2.0 internet-based applications. These software services are provided by different service providers such as Microsoft OneDrive, Google Drive, Dropbox, Box, Amazon Cloud Drive and Apple's iCloud Drive which support these media through their respective Operating Systems. To explain, as an example, OneDrive is Microsoft's service for hosting files in the "cloud", that's available for free to all the owners of a Microsoft account. OneDrive offers users a simple way to store, sync and share all kinds of files, with other people and devices on the Web. Same is the case with other service providers. These providers provide varying cloud storage services.

The main types of social networking services are those that contain category places, means to connect with friends, and a recommendation system linked to trust. Popular methods now combine many of these services such as: Facebook, Google+, LinkedIn, Instagram, Pinterest, Vine, Tumblr, and Twitter (American-based) widely used worldwide; Wechat, Sina Weibo, and Tencent QQ in China; Nexopia in Canada; Badoo, Bebo, V Kontakte (Russia); Delphi, Draugiem.lv (Latvia), iWiW (Hungary); Nasza-Klasa (Poland); Soup (Austria); Glocals in Switzerland; Skyrock, The Sphere, StudiVZ (Germany); Tagged, Tuenti (mostly in Spain); Myspace, Xanga and XING in parts of Europe; Hi5 in South America and Central America; Mxit in Africa; CarnivalPics based in Nigeria; Cyworld, Mixi, Renren, Friendster, Sina Weibo and Wretch in Asia and the Pacific Islands. Social network services can be split into three types: socializing social network services mainly for socializing with existing friends (e.g., Facebook); networking social network services mainly for non-social interpersonal communication (e.g., LinkedIn); and social navigation social network services mainly for helping users to find specific information or resources (e.g., Goodreads for books) (https://en.wikipedia.org/wiki/Social_networking_service).

There are many social media sites. In order to enable you to understand their diversity some of the popular social media sites are described in brief below.

- **Edmodo:** It provides teachers and students a secure place to connect and collaborate, share content and educational applications, and access homework, grades, class discussions and notifications. It helps social media to customize the classroom for each and every learner.
- **Twitter:** It is a real-time information network that connects you to the latest stories, ideas, opinions and news about what you find interesting.
- **YouTube:** It allows a great access to billions of people to discover, watch and share originally-created videos.

- **TED:** It covers riveting talks by remarkable people, free to the world. It is devoted to spreading ideas, usually in the form of short, powerful talks (18 minutes or less). covers almost all topics — from science to business to global issues.
- **Animoto:** It turns your photos, video clips, and music into stunning video masterpieces to share with everyone. It is fast, free, and also shockingly easy!
- **Wikispaces:** A wiki is a space on the Web where you can share work and ideas in the form of text, pictures and links with videos and media. 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.
- **Kidblog:** It 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.
- **Audacity:** You can use Audacity to Record live audio, convert tapes and records into digital recordings or CDs, edit various sound files, cut, copy, splice or mix sounds together, change the speed or pitch of a recording. Audacity is a free, easy-to-use, multi-track audio editor and recorder for Windows, Mac OS X, GNU/Linux and other operating systems. The interface is translated into many languages.
- **Moodle:** It is a Course Management System (CMS), also known as a Learning Management System (LMS) or a Virtual 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.
- **Tagxedo:** It turns words — famous speeches, news articles, slogans and themes, etc — into a visually stunning word cloud, with individual words sized appropriately to highlight the frequencies of occurrence within the body of text.
- **Doodle:** It radically simplifies the process of scheduling events, whether they are board meetings or team meetings, or dinners with friends, or reunions, or weekend trips, or anything else.
- **LinkedIn:** It is specially designed for the business community and professionals. It allows users (workers and employers) to create profiles and “connections” to each other in an online social network which may represent real-world relationships.
- **Google+:** Owned and operated by Google, it helps people to discover amazing things created by passionate people and also to explore your interests, join communities of people around any topic, group things you love into collections, and build a home stream filled with amazing content.
- **Myspace:** Myspace was the largest social networking site which was overtaken by Facebook. It offers an interactive, user-submitted network of friends, personal profiles, blogs, groups, photos, music, and videos. e-mail, a forum, communities, and weblog space.

All the social media discussed above have educational value and significance, but it all depends on the way they can be used by the teachers and the students.

8.6.5 Social Bookmarking

When you are looking at a particular Web site or home page and you want it back to see later quickly, you can create a bookmark for it by saving the link to a Web page. You can add further links to make a list of saved links. The list that contains your bookmarks is called the “bookmark list”. Social bookmarking is thus simply tagging a web page with a web-based tool so that you can easily access it later. Unlike storing bookmarks in a folder on your computer, tagged pages are stored on the Web and can be accessed from any computer.

Social bookmarking is a centralized online service which allows users to add, annotate, edit, and share bookmarks of web documents. (Aichner and Jacob, 2015). Social bookmarking is a user-defined taxonomy system for bookmarks. Such a taxonomy is sometimes called a folksonomy and the bookmarks are referred to as tags. Technorati, a blogging site, describes the system as “The real-time Web, organized by you.” Web sites dedicated to social bookmarking, such as Flickr and del.icio.us, provide users with a place to store, categorize, annotate and share favorite Web pages and files. (<http://whatis.techtarget.com/definition/social-bookmarking>).

A good social bookmarking definition begins with the history of the concept. It was first thought of in April of 1996, with the launch of the very first social bookmark, itList.com. From that point on, the business began to grow, and social bookmarking became known for building relevant links, bringing in traffic and new customers, and the other benefits of social bookmarking that businesses can take advantage of (<http://www.brickmarketing.com/what-is-social-bookmarking.htm>). *Social bookmarking* is a great traffic-boosting *search engine optimization (SEO)* strategy because it’s easy, effective and trendy.

When a link is ready to be put into a social bookmarking network, it is first tagged or submitted to a social bookmarking site. It is tagged with three keywords that are optimized on the website, and then a description of the website is added. From that point on, it can be searched through the keywords on the network. Social bookmarking sites are the best way to promote any website, event or brand so quickly on internet. There are hundreds of bookmarking sites. Some popular social bookmarking service providers are:

- Technorati.com – A blog and business social bookmarking website
- Del.icio.us – A popular social bookmarking service that is the most famous
- Yahoo Bookmarks – A bookmarking service hosted by Yahoo.com as one of their many services
- Google Bookmarks – Another bookmarking service, hosted by Google.com and intended for normal people as well as businesses to use.

Social bookmarking tools are an emerging educational technology that has been drawing more of educators’ attention over the last several years. This technology offers knowledge sharing solutions and a social platform for interactions and discussions (Farwell and Waters, 2010). These tools enable users to collaboratively underline, highlight, and annotate an electronic text, in addition to providing a mechanism to write additional comments on the margins of the electronic

document. For example, Delicious could be used in a course to provide an inexpensive answer to the question of rising course materials costs. RISAL (Repository of Interactive Social Assets for Learning) is another social bookmarking system used for supporting teaching and learning at the university level (Churchill, et al, 2009).

Social bookmarking tools have several purposes in an academic setting including: organizing and categorizing web pages for efficient retrieval; keeping tagged pages accessible from any networked computer; sharing needed or desired resources with other users; accessing tagged pages with RSS (Really Simple Syndication) feeds, cell phones and PDAs (Personal Digital Assistants) for increased mobility; allowing librarians and instructors the capability to follow students' progress; and giving students another way to collaborate with each other and make collective discoveries (Redden, 2010).

8.6.6 Micro-blogging

Microblogging is a web service that allows the subscriber to broadcast short messages to other subscribers of the service. Microblogging is the activity or practice of making short, frequent posts to a microblog. It is a type of blog that lets users publish short text updates. The posts are called *microposts*, while the act of using these services to update your blog is called *microblogging*.

Microblogging is a combination of *blogging* and *instant messaging* that allows users to create short messages to be posted and shared with an audience online. Social platforms like Twitter have become extremely popular forms of this new type of blogging, especially on the mobile web — making it much more convenient to communicate with people compared to the days when desktop web browsing and interaction was the norm (<https://www.lifewire.com/what-is-microblogging-3486200>).

Microposts are brief and can be written or received with a variety of computing devices, including cell phones. Microposts can be made public on a Web site and/or distributed to a private group of subscribers. Bloggers can usually use a number of services for the updates including instant messaging, e-mail, or Twitter. Although most microblog broadcasts are posted as text, some microblogging services allow video or audio posts. Social networking sites, like Facebook, also use a microblogging feature in profiles. On Facebook this is called “Status Updates”. Subscribers can read microblog posts online or request that updates be delivered in real time to their desktop as an *instant message* or sent to a mobile device as an SMS text message. The appeal of microblogging is both its immediacy and portability.

Check Your Progress

Notes: a) Space given below the question is for writing your answer.

b) Check your answer with the one given at the end of this unit under “Answers to ‘Check Your Progress’ Questions”.

4) What do you understand by Web 2.0 tools? Give some examples.

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8.7 LET US SUM UP

In this unit, we have explained the concept of e-learning and the instructional design process involving defining objectives, creating powerful learning environment, supporting e-learning, developing dynamic and sustainable content, its delivery, and evaluation, among others.

E-Learning is simply a mode of learning which requires different resources. We have discussed different types of e-learning resources including the web-based resources and their characteristics. It refers to technology-enabled, web-based delivery methods. It is both an approach and a strategy to facilitate and enhance learning through both computer and communication technology. In e-learning environment the learners get synchronous and asynchronous feedback. The performance of the learners is assessed through their participation in activities, project work, homework, examination, etc. E-learning thus fosters a multiuse environment, yet has the ability to track individual students and monitor their progress.

Like any other mode of learning, e-learning too has strengths and limitations. Success of e-learning depends, to a great extent, on the motivational level and learning skills of the learners. To make e-learning environment attractive, we use effective learning strategies suited to the needs of the learners. We have to devise or adopt an appropriate learning management system and learning content management system. E-learning management is electronic environment that enables the delivery, management and administration of range of learning activities, services, content and data. LMS and LCMS complement each other.

E-learning through Web 2.0 tools has transformed the very concept of teaching and learning. In this context we discussed the role and place of current developments such as Blogs, Wikis, Social Networking, Social Book Marking and Micro-blogging in promoting e-learning.

We hope the unit has provided you relevant content to enable you realize the objectives of the unit.

8.8 ANSWERS TO ‘CHECK YOUR PROGRESS’ QUESTIONS

- 1) E-learning (electronic learning) is a type of learning carried out, facilitated or supported by electronic gadgets, media or resources. E-learning encompasses electronic devices, services and information that are not always dependent or linked to online. However, currently, e-learning is popularly referred to that learning mostly facilitated through the Internet. In this context, e-learning has been defined as interactive learning in which the learning input/experience/content is available online and provides automatic feedback to the learner's learning activities. The focus of e-learning is usually more on learning content than on communication between learners and teachers. E-learning covers a wide set of applications and processes such as web-based learning, computer-based learning, and all types of digital learning. It includes webinars, live online classes, real time communication and interaction between distance teachers and learners such as teleconferencing,

video-conferencing and computer-based conferencing, e-mail, live chat, surfing on the Internet (Web browsing), online reference libraries, video games, customized e-learning courses, etc.

E-learning has direct link with open and distance system. In ODE context, e-learning refers to utilizing electronic technologies to access educational curriculum outside of a traditional classroom situation. It enables students to access, investigate, analyse, construct and evaluate concepts and ideas encountered in their courses. It is useful to offer a course or programme completely online via the Internet and the web.

- 2) E-learning resources include: digital print, digital audio, digital video and web-based resources.
- 3) Learning Management System (LMS) is a global term for a computer system specifically developed for managing online courses, distributing course materials and allowing collaboration between students and teachers. It is a comprehensive e-learning delivery system, designed to provide efficient tools for creating electronic lesson plans, class assignments, tests, threaded discussions, video conferencing and discussion forums, etc and to track the progress of individual students in a course including completion. The institution providing e-learning manages the entire learning process through LMS. It is thus a software for planning, organizing, implementing and controlling the learning process. It enables the delivery, management and administration of a range of learning activities, services, content and data.
- 4) In contrast to Web sites where people are limited to the passive viewing of content, a Web 2.0 site (or tool) may allow users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community. Web 2.0 offers revolutionary new ways of creating, collaborating, editing and sharing user-generated content online. Web 2.0 tools can be used to enhance teaching and collaboration among teachers and students as well as increase professional collaboration between and among educators. Examples of Web 2.0 tools include: social networking sites, blogs, wikis, Social Networking, Social bookmarking, and Micro-blogging, among many others.

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Suggested Readings

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8.10 UNIT END EXERCISES

Unit End Questions

You may write brief notes or full-length answers to these questions in your own interest. It might help you during your preparation for examination.

- 1) What is e-learning? Explain its pedagogy and design process. (1000 words).
- 2) Discuss different types of e-learning resources. (500 words).

- 3) Explain the utility of digital content creation tools in development of e-resources. (500 words).
- 4) Explain the significance of LMS and LCMS in delivering e-learning. (1000 words).
- 5) What do you understand by Web 2.0 tools? Explain their relevance in the present day world. (1000 words).



Questions for Critical Reflection

- 1) What do you think are the limitations of e-learning in comparison with the predominant ODL practices?
- 2) Though e-learning offers new teaching and learning environments, it poses serious challenges to the academic staff of concerned institutions in terms of expecting them to assume new responsibilities and to acquire a range of new skills and talents. Do you think these challenges are easy to overcome? Justify your answer.
- 3) Do you think Web 2.0 tools rendered traditional media outdated in their reach and appeal? Justify your answer with suitable examples.

Activity



Select any tool of your choice and convenience/comfort from among the respective websites mentioned under sub-sections 8.4.1 to 8.4.9 of section 8.4. Try to use the selected tool and record your experiences on a separate sheet of paper. You carry it with you to share your experience in using the tools with your colleagues, academic counselors and resources persons during any scheduled opportunity you get at your study centre.



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BESE-131
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DEVELOPMENT OF ODE RESOURCES**

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