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## **UNIT 5 DESIGNING SELF-LEARNING MATERIALS**

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### **5.0 INTRODUCTION**

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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.

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## 5.1 OBJECTIVES

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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.

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## 5.2 INSTRUCTIONAL STRATEGIES

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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

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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](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.

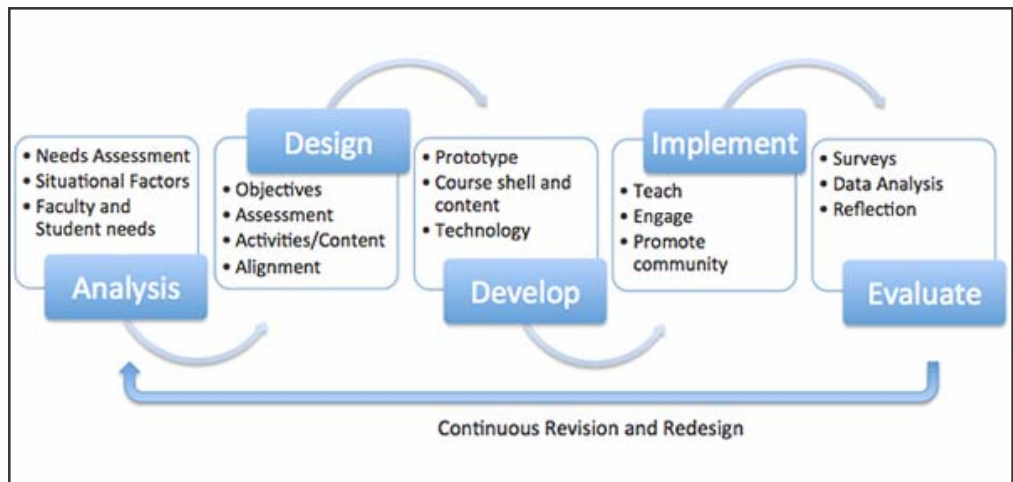


Figure 5.1: ADDIE Model

Source: [http://ecampus.uconn.edu/course\\_development/addie.html](http://ecampus.uconn.edu/course_development/addie.html)

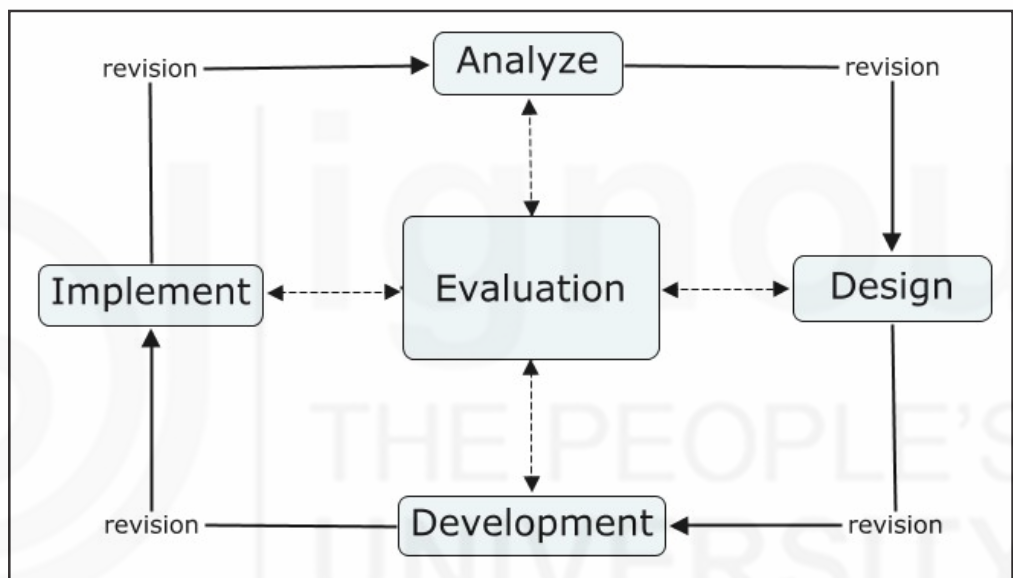


Figure 5.2: ADDIE Model

Source: [https://en.wikipedia.org/wiki/ADDIE\\_Model](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](http://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?

i) ASSURE

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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

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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.

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## 5.6 PRACTICAL IMPLICATIONS OF THEORIES FOR DESIGNING SLMs

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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.

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## 5.7 KEY CONSIDERATIONS OF DESIGNING SLPMs

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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

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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 SLPs. We will discuss in detail development of SLPs in Unit-7.

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## 5.9 ANSWERS TO ‘CHECK YOUR PROGRESS’ QUESTIONS

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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

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### 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 SLPMs. (500 words).
- 6) What are key features of designing SLPMs. (500 words).
- 7) Explain the process of designing SLPMs. (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.