UNIT 3 IMPLICATIONS OF THEORIES FOR COURSE DESIGN

3.0 OBJECTIVES

In this unit, our main purpose is to discuss the implications of a few learning and communication theories for distance education. Besides, we have examined how a distance educator can benefit from these theories in designing self-learning materials, and in selecting various media for distance teaching.

After having worked through this unit, you should be able to:

- relate the theories of learning and communication to the instructional practices used in distance education,
- relate and describe how the theories of learning and communication are helpful in designing self-learning materials,
- list a few principles of media selection for distance education, and
- design a study unit in an effective self-learning format.
3.1 INTRODUCTION

In units 1 and 2 of this block, we discussed a few theories of learning and communication and their implications for education. Now, in this unit we will look into how the practice of distance education benefits from the learning and communication theories. As distance educators, you will also be engaged, in the future, in developing self-learning materials for distance learners. So it is important for you to learn how the features of these learning and communication theories can be applied to the instructional practices used in distance education, especially in the design of self-learning materials.

The concepts of learning and communication are interrelated. With effective communication the rate/quality of learning at a distance improves and with advances in communication technology the individual distance learner overcomes the barriers of distance and time. The four theories of learning (Behaviourism, Cognitivism, Gagné's synthesis and Bloom's model) and theories of communication (Mathematical, Information, Free press and Social responsibilities) guide the course writers/distance educators to develop and design self-learning materials in any branch of education/knowledge.

3.2 LEARNING THEORIES AND DISTANCE EDUCATION

In unit 1 of this block, you have already been acquainted with four major schools of thought dealing with human learning along with their educational implications. As distance educators, we are interested not only in knowing about but also in applying the different principles of human learning in the process of distance education. We are also concerned with how distance learners learn, and in what way we may facilitate their learning.

Before we examine the applications of the theories of learning in the process of teaching/learning in distance education, let us outline the distinct nature of the autonomous learner (the distance learner).

Individualisation and autonomy of various degrees characterise a distance learner who learns through mediated communication. All learning in distance education is essentially a personal activity. Every distance learner works on his/her own for which there is a need for individual tutoring. From this point of view, the theories of learning become more important in distance education than in formal classroom learning. Given below is a brief description of the applications of the four theories of learning in distance education in the same order used in unit 1.
3.2.1 Behaviourism

The behaviourists emphasise the connection between stimulus and response as a cause of learning, which for them is a change in human behaviour. Skinner, a prominent behaviourist, propagated the concept of *operant conditioning*, and viewed that behaviour (in the process of learning) changes according to its immediate consequences—pleasurable or unpleasant. Learning objectives are divided into a large number of small steps. Each of these steps is led by a stimulus and the set of response(s) and each step of learning is strengthened so that they recur in future and cause more learning. To promote the recurrence of such responses to cause more learning, both positive and negative reinforcements 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, films, etc. are used successfully in distance teaching/learning. Two principles—that learners play an active role in learning, and that they proceed at their own pace—greatly help a distance teacher to design self-learning 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. These principles help in identifying the aims and objectives of a course unit in terms of the 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 positive reinforcement in the form of questions and exercises, followed by relevant answers.

Besides, machines or electronic devices are used to reinforce learning and to support individual pace of the distance learner. Machines make it possible for a learner, who has for some reason given 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 which is specially meant for those who may have left the classroom years ago (for whatever reason) and now want to continue their education. This principle is important for distance education as 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 keep pace with student's progress in learning, to grade their performance, and to give them necessary feedback about their progress. So assignments functions as tools to provide reinforcement to the distance learners.
3.2.2 The cognitive approach

The cognitive approach to learning emphasises the psychological functioning of an individual. Stress is laid on how a learner remembers and retrieves information from the memory. Instead of developing by means of a mechanical sequence of stimuli and responses, learning takes place through insight-formation and successful problem-solving. Information processing, learning as a cognitive process, and feedback from the consequences of one's own actions are the three basic components of the cognitive approach to learning. Bruner, a cognitive psychologist, describes learning as a cognitive process which involves the acquisition of new knowledge, the transformation of acquired knowledge, and the evaluation of the adequacy of acquired knowledge.

You have already studied about these facts with regard to cognitive learning in unit 1 of this block. Now you should go through sub-sections 1.4.1 (p. 24) and 1.4.3 (p. 27) once again before looking into the implications of this approach for distance education.

Implications for distance education

Various principles of learning emphasised by the cognitive theorists have influenced the practice of distance education. As the primary emphasis in distance education is on self-learning, the cognitive approach appears to be well suited to it.

Secondly, the distance learner is to be made to approach learning as an act of discovery (to rediscover the facts) so that s/he may exercise autonomy in learning through self-reward. The self-learning material should ensure the active involvement of the distance learner with these contents of such material so that s/he may learn without any significant external reinforcement. 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 (Holmbrg, 1981) are, viz.,

i) developing in the learner a predisposition towards 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 in which to present the material, and
iv) specifying the nature and pacing of extrinsic and intrinsic reinforcement.

All of these are applicable to distance learning situations—instruction provided to a learner may proceed step-wise from direct experience to representation of experience, and then to symbolic representation.
Check Your Progress 1

i) Describe in about 8 lines on what grounds both behaviourist and cognitive approaches to learning make complementary contributions to distance education.

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

Note: a) Space is given below for you to write your answers.
   b) Compare your answers with those given at the end of this unit.

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3.2.3 Gagné’s synthesis

Gagné synthesised the approaches of the behaviourist and the cognitive theorists to learning. For him, learning is a change in human disposition or
capability that takes place inside an individual’s mind. He put forward hierarchical conditions of learning and identified nine phases of learning that include both internal and external events. These phases range from generating the learner’s attention through stimulus to generalisation or transfer of learning for solving new problems. Besides, he suggests eight types of learning, beginning with a simple form of learning (signal learning) and ending with the most complex one (problem solving).

Implications for distance education

Gagné’s model of information processing and the hierarchical model of eight types of learning (see pages 29-33) moving from simple to complex forms, have significant implications for distance education. Instruction should be designed in such a way that the second step is taken only after the first one is thoroughly accomplished. The various events of instruction suggested by him are immensely helpful to the course designers. These sequenced events guide successfully not only conventional classroom teachers but also distance teachers, television script writers, and instructional designers.

Stimulus in the form of diagrams, charts, etc. in the learning materials presented through video tapes or television appeals to the interests and curiosity of all types of learner. Every distance learner is to be informed of the objectives and of how s/he would know when s/he has learned what is expected of him/her. 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 may notice this approach being followed in the units of the block which you are now going through. In distance learning the learner goes through the stimulus (materials or course materials) only when s/he is ready to learn. S/he is also provided with guidance (whenever called for) through correspondence, and personal contact programmes at study centres. Feedback is provided through comments on the assignments, and there is continuous assessment of his/her performance through more and more assignments. The self-learning materials are written in such a way as to make the learner perform varied tasks relevant to his/her studies.

Gagné has also been specific about the choice of media. In distance education, one can make a tentative choice of medium 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. (We shall elaborate on this point later in this unit).
3.2.4 Bloom's model

Bloom classified learning outcomes into three domains—cognitive, affective and psychomotor—with greatest emphasis being laid on the cognitive domain. The cognitive outcomes of learning are classified under six headings, viz., knowledge, comprehension, application, analysis, synthesis and evaluation. Through the process of ‘task analysis’ educational behaviours can be classified and graded from simple to complex based on the level of learning.

At this stage, you can take a look at the few pages on Bloom’s model in section 1.6 of this block.

Educational implications

The basic application of Bloom’s model of distance education is that the separate stages of learning in the cognitive domain can help the course designer to decide the objectives of the course, and help him/her choose the best from the various media available for the purpose. In the selection of medium/media, learning objectives must be one of the major 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 any other medium. 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), TV viewing with supporting home kits are called for, or learning with the help of a live instructor in face-to-face situations may be necessary in certain cases.

Besides, if the objectives of learning are expressed in behavioural terms,
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evaluation of learning outcomes can be based on observable behaviour which the learner is expected to display.

Check Your Progress 3

State, in about 8 lines, how Bloom’s contribution may be made use of in distance learning.

Note: a) Space is given below for you to write your answer.
   b) Compare your answer with the one given at the end of this unit.

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3.3 COMMUNICATION THEORIES AND DISTANCE EDUCATION

Communication 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. 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 inter-personal communication, in distance education interaction goes on through mediated communication in which various media, including ‘print’, play important roles. So an understanding of communication theories is central to a distance educator, since it offers an additional conceptual framework for examining the use of media for course preparation. In what follows is a brief account of the implications of the four theories of communication (which we introduced in unit 2) for distance education.

3.3.1 Mathematical theory

To a casual reader, a discussion of the mathematical theory, here or elsewhere in this course may appear to be an irrelevant exercise. But, there is a strong reason for our having brought it into our discussion. We consider this 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 vise versa. This emphasis has resulted in a gradual rise in the quality and quantity of information passed on through the various media of communication—more than one message going along the same line, possibilities of teleconferencing, emergence of audio and video cassette technology, uses of on-line computers, etc. In short, we suggest that the 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 communication to a great extent, and, as a consequence, educators may choose one of the available media as their primary medium of instruction, but they have a host of others available to be used for different purposes of enhanced educational communication. And so the distance learner may use the medium that suits him/her the most.

3.3.2 Information theory

Central to the information theory of communication is the process of successful communication. The success of communication, it is suggested, depends on
i) The messages selected for transmission—they must be relevant to the needs of, and must meet the expectations of, the receiver (the distance learner in our case).
ii) The signals chosen for encoding the message—the receiver must be able to decode them easily for his/her benefit, and
iii) The feedback from the receiver—it should function as a stimulus to further communication and improve the process of interaction thus established.

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 information theory, be it for purposes of selection, presentation or modification of teaching materials.

3.3.3 Free press and social responsibility theories

Once again, a casual reader may question the relevance of these theories to the theme under consideration, as they obviously pertain to socio-political aspects of communication, and not to education. At this stage we draw your attention to Blocks 1, 2 and 3 of Course ES-311 in which we have made it clear that distance and open systems of education have been adopted the world over as a result of a new kind of socio-political awakening. This awakening emphasises the democratisation and universalisation of education. Thus, as the situation obtains today, the strongest plank for distance and open education is essentially socio-political in character—hence a consideration of these theories is quite in place here.
The free press theory upholds freedom of expression, which has direct implications for freedom of learning, that of teaching and any type of educational communication. The learner should be able to get what s/he is looking for, and the institution should be able to provide the education for which it is approached. Education has to be a free enterprise. The social responsibility theory emphasised 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 distance and open education too effect mass communication using the same means, i.e. the print and the other media. In the ultimate analysis the function of distance and open education is not very different from that of the press and the media, namely, educating the masses, democratising and universalising education.

We remarked above that education has to be a free enterprise. It has to be so both in terms of its content and its operational aspects. Unlike conventional classroom education, open education is open also because it is not based on closed (indoor) communication. It is open in more senses than one, since it is open to public criticism at each stage of its operation, and its content too is open to all. This openness itself is a means of making such education socially responsible. Viewed in this way, open education is a socially responsible, free educational enterprise.

3.4 THEORIES OF LEARNING AND COMMUNICATION : IMPLICATIONS FOR COURSE DESIGN

In the foregoing sections we discussed the broad implications of the theories of learning and communication for distance and open education. Having projected the relationship between these theories and distance education at the cognitive level we now turn to the practical aspects of these implications.

Some time in the future, a distance educator may be asked to perform activities and achieve objectives which cannot be thought of today, but at present, society in general and academics in particular expect such an 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 the classroom? A straightforward way of answering this questions 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.
Activity 1

Note:  a) Use the space given below for your answer.
       b) Please do not proceed before you complete this activity.

List about 10 words and/or phrases to indicate what, from your point of view, a trained and/or successful classroom teacher does (in a classroom) in order to make his teaching effective. For example, motivates the learners.

1 Motivates the learners  6
2                                        7
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What does a trained conventional classroom teacher do in a classroom? S/he performs a number of activities which are aimed at facilitating learning by learners. These activities are:

i) Presenting the materials: Most of the time allowed to a classroom teacher is spent in presenting the prescribed materials, available in a text or some other form. The teacher is supposed to breathe life into that text and help the learner communicate with it.

ii) Identifying the objectives: The syllabus and very often the prescribed text itself make it clear as to what educational objectives are to be achieved through a particular course and/or text. But, practically, it is the teacher who identifies them for the learner. It is the teacher who points to what is significant and what trivial, what needs to be paid what degree of attention, and for what purpose.

iii) Motivating the learner: To reduce distraction, the teacher provides motivation. S/he brings learners to a state of readiness, in which condition 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 demotivate learners in more than one way.

iv) Exploiting learners’ experiences: Good teachers build their teaching on learners’ experiences. The same concept may be brought home to rural learners with the help of their experiences, and to those of urban background with theirs.

v) Providing learning activities: Once a new concept is taught, or a new piece of information is given, the teacher promotes learning through
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learning activities. For example, after having taught a formula, the teacher asks learners to apply their learning to work out solutions to a few questions.

vi) Facilitating retention: Just knowing about a concept does not amount to having learnt it. The learner should be able to retain (what s/he may have learnt) in his/her memory—both short-term and long-term. Good teachers use different means to help their students to facilitate and improve their retention of concepts.

vii) Promoting transfer of learning: Having learnt a concept or obtained any new learning, the learner should be able to transfer his/her learning to various issues within his/her discipline as also across various other 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, the transfer of learning has yet another meaning—facilitating further learning.

Used in either sense, transfer is promoted by the teacher in the classroom through various means.

viii) Providing occasions for feedback: For successful teaching we need two way feedback—from the learner to the teacher, and vice versa. The teacher provides occasions for this exchange, for example, s/he puts a few questions to see whether or not the learners have learnt what s/he taught, and then teaches again if s/he needs to.

ix) Providing guidance in various ways: Teachers use various techniques to keep the learners on the right track. In general we may say that all the items above constitute guidance but in particular we may extend the meaning of guidance to cover various other considerations such as emotional, domestic ones etc.

Activity 2

a) List the pedagogic functions of a unit. Prepare an outline (just the key words) suggesting how the listed functions may be fulfilled in Distance Education in the absence of the teacher.

b) We shall answer this question separately. So please do not proceed till you prepare an outline.

Try and list how each of the above pedagogic functions of a teacher may be fulfilled through self-learning materials.

Note: Kindly use a separate sheet for this activity.
3.4.1 Presenting the materials

The presentation of the materials depends on the type of course. If the course is independent of any prescribed texts, presentation will succeed if it has the following features:

i) **Intellectual clarity:** Materials to be presented should be analysed logically before they are put into any format. This logical analysis will suggest the best order in which the various sub-themes of a particular theme may be presented. Such an order will maintain both the continuity and the consistency of what is presented. It should be taken for granted that if the author is not clear about what s/he wants to present, his/her presentation will not promote self-learning among learners.

ii) **Linguistic simplicity:** Complex language and expression does not promote self-learning. The materials should be presented in simple everyday 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. So, 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) to concretise what we may be presenting to our learners.

iv) **Appropriate media:** Research and experience have shown that in general 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. Besides, the choice of the medium should be governed by the considerations of cost efficiency also (for a detailed discussion on this issue, please turn to section 3.5).

3.4.2 Identifying the objectives

In self-learning materials, this role of the teacher may be achieved by listing clearly what the objectives of a particular course unit are. Still better, these objectives can be listed separately if they pertain to different domains.

i) In the **cognitive domain**, however, one emphasises the aspects of cognition in learning, which are to have correct and relevant information, conceptualise reasonably well, recall easily and correctly, generalise, etc. Objectives pertaining to this domain may be put in cognitive terms.

ii) In the **psychomotor domain**, the objectives should indicate clearly which skill is to be displayed by the learner after s/he has worked through a particular study unit.
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iii) There are subjects, like Commerce and Technology, which may have an equal share of cognitive and behavioural objectives. In such cases, the objectives need to be put in mixed terms, indicating, as far as possible, which are behavioural and are cognitive in nature.

iv) In subjects like mathematics and languages, (in which a learner cannot work properly at the second level if he/she hasn't achieved reasonable proficiency at the first), the objectives need to be stated in behavioural terms, i.e., the course unit should indicate clearly what the learner should be able to do after s/he studies/works through the unit. For example, the objectives could be listed as follows:

   a) The learner should be able to solve simple quadratic equations.
   b) The learner should be able to answer at least eight comprehension questions (out of ten) on an unseen passage of a given standard.

In addition to the domain specification of objectives, we must be clear about the various levels of stating the objectives for a particular purpose.

For example, for potential students and the public we may list the objectives of a course/study unit differently, depending on who the students or the public are; for an authority from the Ministry of Education we will talk about the objectives in very broad terms; for course writers we would be more specific about the objectives, for they have to shape the course according to the specifications we give them; and finally for the learner we have to be even more specific for s/he has to achieve the specific objectives.

As far as the presentation of objectives is concerned, course writers may present them in various ways:

- In a rectangular panel,
- In the form of a list, or
- With the help of a checklist, etc.

3.4.3 Motivating the learner

Self-learning materials, in the same way as live teachers, may be highly motivating, moderately motivating or demotivating. The degree of motivation which such materials promote among the learners depends on the nature of the (i) external characteristics and (ii) internal characteristics of the materials.

i) External characteristics: All learners, young and old alike, would be motivated to go through the materials if their external characteristics are pleasing. Learners prefer looking into books which present diagrams in pleasing colours. The cover, the paper size, the typography, the format, the layout and even packaging can contribute to motivating the learners to work through the materials. It can be argued that course writers may not have been asked to take decisions regarding the externals of the materials as
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suggested in this paragraph. True, but a better informed course writer can
make useful suggestions in this regard which may be appreciated by the
decision-makers.

ii) Internal features: Ultimately, it is the quality of the materials presented
which motivates the learners. In this connection it has been observed that
the materials would be highly motivating, if they:

- fulfil the needs of the learners,
- exploit the experiences of learners,
- use a personalised 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.

3.4.4 Exploiting learners’ experiences

As indicated under item (ii) above, one of the ways of motivating learners is
to draw upon their own experiences while presenting the materials. 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. How may this idea be put into practice in
designing a course unit? There are at least two ways available to the course
designer and one may think of many more:

i) Structure of the unit: While designing the course unit, the course writer
may make a gentle start by using material and/or information which is
already known to the learner. As the course advances, the content and its
complexity may be increased gradually. For purposes of reinforcement,
revisions may be more frequent in the initial stages.

While speaking of this idea of structure, we may also emphasise the use of
personalised language. Such language, as against strongly formal language,
is within the experience of most learners. Using informal/personalised
language brings the course unit closer to the learner’s experience (of
language).

Besides, if the course writer provides a study guide wherever needed—or as
a rule at the beginning of a unit—the learner will certainly link the material
presented in the new unit with what is already known to him/her. A study
guide may consist of notes or hints of the following type:

- Before you start working on unit M, please study once again sub-section
4.3.1 of unit N, Course 2.
- To study unit P you need to have a dictionary by your side. Besides,
you are advised to make your own notes as you work through the unit.
- Having studied unit D, you must conduct experiment No. 6 before you
proceed to unit E, etc.
ii) Sources for the choice of experiences: Depending on the subject/discipline the course writers may choose from:

- natural phenomena for subjects/disciplines like the life-sciences, geography, etc.
- adult experiences for sociology, economics etc.
- everyday affairs for commerce, medicine etc.
- folktales and sayings for fine arts, history, literature, etc.
- mass media such as popular T.V. serials/programmes for child care, sports etc.

What has been presented above is only a suggestion. It is not as though natural phenomena do not provide experiences in the area of economics; we have only tried to show that experiences are available all around us, and we need to choose among them purposefully.

3.4.5 Providing learning activities

It is said that one learns best by ‘doing’. Self-learning materials provide learning activities in various ways. Some of the more significant ones are touched upon below:

I) Exercises: We may ask the distance learners to work on various types of exercise which are incorporated at appropriate intervals in the teaching materials. Having worked on the exercise the learner can check the degree of his/her success with the help of possible answers provided in the unit. If it is not possible to provide a possible answer, the course writers may present a probable solution or just a few hints pointing to the possible answers.

Depending on the resourcefulness and interest of the course writers, a wide variety of exercises may be presented.

The distance learner may be asked to:

- Draw conclusions from the discussion(s), details or information present in a unit,
- Express in the form of a diagram what has been detailed in the unit,
- Play a game which involves not only the reinforcement of what has been learnt but also leads to new learning, etc.

II) Work on useful materials: The course writers may

- Direct the distance learners to additional materials such as books, papers, folklore, etc.,
- Advise them to go on a study visit to collect information/materials,
- Conduct an experiment.
iii) Assignments: Working on assignments is an important activity for the distance learner. Here we need to indicate how an assignment differs from an exercise.

At the Indira Gandhi National Open University for example, assignments are used for continuous assessment (some prefer to call it internal assessment). Assignments demand relatively longer answers and are usually placed at the end of a block or supplied separately. The purpose of assignments is two-fold. They are used partly to assess the performance and the progress of the learners, and partly to provide a means for building purposeful interaction (two-way didactic communication) between the teacher and the learner.

Assignments may consist of different types of question:

- **Open ended questions** which permit a learner to present arguments for and/or against a certain proposition,
- **Multiple choice questions** which may be marked with the help of a computer, and
- **Project type questions** which ask for data to be collected, analysed and conclusions to be drawn from the analysis.

One may add to this list of question types depending on the objectives and the nature of the course concerned.

iv) Other activities: It should be noted that the activities listed above are illustrations only. The variety of activities depends on the resourcefulness of course writers.

Performing an experiment, expressing and enlisting constructive suggestions and criticism, redesigning a given unit, having a pause to refresh oneself and the like are activities that have pedagogic significance. And all these can be incorporated with the help of suitable instructions built into the study units.

### 3.4.6 Facilitating retention

A well-known technique of helping learners to improve their 'retention' is to provide frequent repetitions at appropriate intervals. Such repetitions and revisions can be provided in self-learning materials with the help of intext questions, sub-sectional summaries, assignments, etc.

Secondly, one of the most effective ways of helping learners' 'retention' is to make them understand what is taught. Understanding helps in abstracting what is learnt. To help learners understand what is presented in self-learning materials, course writers should present an adequate number of illustrations, appropriate explanations, etc.

Thirdly, a ‘problem solving’ approach to learning also helps ‘retention’. The study units should provide opportunities for applying what has been
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taxed and learnt. Application type exercises ask the learners to apply their
learning to real life situations, present a new point of view, identify the
weaknesses in an argument or a concept, etc. The very process of applying
a principle to a situation and/or a problem helps the learner to retain that
principle in his/her long term memory.

3.4.7 Promoting transfer of learning

To have learnt a new concept, a new skill, or adopted a new attitude through
the process of teaching and learning is not enough. A learner may be said to
have achieved learning satisfactorily only if s/he can transfer his/her
learning to new situations within a particular discipline and also across
disciplines, if necessary. Obviously, one of the ways of promoting such a
higher level of learning is to put the learner through more complex
application and problem-solving types of exercise. This objective may be
achieved in self-learning materials with the help of the activities listed
below:

i) Identification of similarities/parallels:

- Exercise in pointing out parallels in a given group of situations, items,
  issues, etc.
- Exercises in providing examples and/or illustrations of parallels in
  situations, phenomena, consequences, etc.
- Exercise in looking for parallels/similarities by identifying forward
  and backward references to the same phenomena, etc. within a text.

ii) Identification of dissimilarities: The exercise types suggested under
(i) above can also be used for identifying dissimilarities.

iii) Application of learning/knowledge:

- Exercises in applying one’s knowledge in different fields, for example,
  the notion of dynamics, may have been learnt primarily from
  mathematics, but this notion can be used/applied in understanding or
  explaining some social phenomena in terms of social dynamics.
- Exercises in identifying overlaps (this type of exercise is more
  advanced than the types suggested under items (i) and (ii) above) and
  thus moving on to new discoveries.
- Application exercises of various types and of differing levels which
  help the learner to proceed towards advanced learning with greater
  ease and confidence.

3.4.8 Providing feedback

Two-way feedback between the teacher and the learner is a means of
providing the necessary correctives, revisions, modifications and repetitions
needed in the process of teaching and learning.
Self-learning materials provide such two-way feedback with the help of the following devices:

i) **Structure**: The study units are structured in the form of small steps. Each step provides something to learn, and is followed by exercises of various kinds — in-text questions, self-check exercises, etc. The learner is expected to work on these exercises and reinforce his/her learning by checking his/her answers with the ones provided by the course writers. In certain cases the course writers may provide the actual answers, in others just a model answer, and in still others they may only suggest a possible answer. Whatever the type of answer provided, it serves as feedback to the learners.

ii) **Let us sum-up sections**: The course writers provide sum up sections from place to place within a block and/or a unit. One may sum-up details, etc. using the following devices:

   - Summaries
   - Schematic diagrams to present the whole information visually
   - Schematic questions, answers to which, when worked out by the learners, form a summary of the materials presented.

   You may think of other ways of summing up details.

iii) **Assignments**: As we have already written about assignments in sub-section 3.4.5, we shall not touch upon this theme here. However, we need to emphasise that the comments (by tutors or by the computer) on the assignment-responses provide valuable feedback to distance learners.

### 3.4.9 Providing guidance

'Guidance' is a cover term that subsumes all that has been listed in the above sub-sections — from 3.4.1 to 3.4.8. However, here we may list certain other aspects of self-learning materials which we could not accommodate in the above sub-sections.

i) **Anticipating questions which the learners may raise**, is one of the characteristics of all good teachers. Similarly, good course writers anticipate questions and provide their answers in the study units by way of simplifying a difficult concept, exemplifying it in different ways, focusing on essentials, leaving out non-essentials, etc.

ii) **Typography too can be used as a guide**. Different type faces and sizes, multi-coloured print, division headings and different shades, can all provide guidance to learners as they become increasingly familiar with the logic behind the typography used.

iii) **Instructions of various types**, for example *prescriptive and suggestive*, have a definite role to play in guiding the learner through the course units.
Factors in the Design of Print Materials

iv) Introductions may be made to perform some important pedagogic functions such as to build links with what has gone into the course earlier, indicate what is to follow and in what order, what preparation is required to get the best out of a unit, etc.

3.4.10 Conclusion

In the above nine sub-sections we have tried to show how learning materials can perform the functions of a teacher, and thereby how 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.

One may feel that the suggestions given above are too many to keep track of, and that it may not be possible for course writers to accommodate all of them while preparing a course unit. To this we say that what has been suggested above is an elaboration on the issues involved, an attempt to link theory with practice. In practice, we may reduce the entire discussion to two notions:

- Access devices, and
- Learner-active materials

Access devices are those means which help the learner to grasp what is presented in a study unit. Introductions, glossaries, sections' headings, explanations, diagrams, etc. are all access devices.

Learner-active materials are those which have to be worked through. These materials do not lend themselves to such reading strategies as are employed in reading novels but require a different kind of reading.

A self-learning study unit must be learner-active, providing an adequate number of learner-activities to achieve its objectives.

This brings us to the notion of unit design. How should a study unit look like?

Activity 3

Present a schematic diagram of a unit.

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Note: For comparison, our suggested answer is available elsewhere in this block (See the block introduction of this booklet).
Having decided on the appropriate unit design the course writer has to decide the best possible sequence/arrangement of the components of the main theme of the unit. A particular theme may consist of a few sub-themes, and a sub-theme may be presented as follows:

<table>
<thead>
<tr>
<th>Sub-Theme</th>
<th>Information</th>
<th>Self-check exercise</th>
<th>Discussion</th>
</tr>
</thead>
</table>

Revision exercise  ←  Illustration  ←  Activity

| Summary | Glossary | Answers to self-check questions, exercises, activities, etc. |

Scheme 1: Structure of a section of a study unit

Please note that scheme 1 is a mere illustration. There can be many variations of this scheme. For example, another possible scheme may be as follows:

<table>
<thead>
<tr>
<th>Sub-Theme</th>
<th>Discussion</th>
<th>Illustration</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Information</th>
<th>Self-check exercise</th>
<th>Activity</th>
</tr>
</thead>
</table>

| Further Information |

| Summary | Self check exercise | Answers to self-check questions, exercises, activities, etc. |

| Glossary |

Scheme 2: Structure of a section of a study unit
Activity 4

Select a unit of this block and study its presentational design. Present its structural design schematically in the space provided below:

Does it perform the various pedagogic functions adequately? (Use the following space for your answer).

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3.5 PRINCIPLES OF MEDIA SELECTION

The choice of media is an important factor in making distance education a success. The concept of media equivalence, and the research conducted in this area confirm that any medium is good enough to carry information. Given a reasonably favourable situation, a distance learner will learn from any medium—television, radio, programmed instruction, computer assisted
Implications of Theories for Course Design

learning through print, films, filmstrips software, etc. However, we cannot make an arbitrary choice of medium because our aim is to achieve our educational objectives by using the most suitable medium.

Certain factors which influence the learning process both in face-to-face teaching and media instruction are common. Relevance of the content, intellectual clarity and logical sequence of presentation, linguistic simplicity, the need to repeat the main points, the teacher's sympathy towards learners, learners' motivation, their involvement in the subject and their respect for the teacher/instructor affect the amount and the quality of learning equally in both situations. Nevertheless, media technology is different from the teacher in that it has to be used and controlled by the learners as well as the instructor who justifies the choice of the media.

Schramm (1977) suggests that questions pertaining to the instructional strength of the material, the cultural and situational context, the learners' access to the various media and the resources available to the programme are more important than the question of which medium is the best for delivering information. Yet, we cannot rule out the need to select the right media. Local needs, situations, resources, the nature of the subject matter, the anticipated target group, suitability of the mode of delivering information, political considerations, prestige issues, newness of available technology, etc. make it necessary to choose the most appropriate media. In doing so, we have to consider the pedagogic, the technological and the economic aspects of the issue. Schramm (1977) calls these aspects the three vectors: Task vector, Media vector and Cost vector. Task vector analyses the educational needs, the objectives to be achieved through educational tasks and the learner's abilities to control and use the media technology. The Media vector explores the availability of the media, while the Cost vector examines the economics of the media—i.e., the resources and costs in terms of money, manpower, and technology. In practice, however, all the three vectors are interconnected, and they interact with each other. The teacher or the planner who chooses the media should keep in mind the pedagogic relevance, the availability of the technology and the cost effectiveness of the media selected.

Some of the factors to be considered while selecting the media are:

i) Accessibility (i.e., whether the media selected are accessible to learners),
ii) Convenience or usability (i.e., whether learners can use the media as and when they want to),
iii) Control over the media technology by the learner as well as the teacher,
iv) Production and delivery costs, and
v) Organisation (i.e., meeting the current requirements of technology, maintenance of the equipment, etc).

The emphasis, however, should be on achieving the educational objectives through the use of appropriate media rather than on the cost and technology of media although the latter do influence the eventual choice. If media is
Factors in the Design of Print Materials

integral to the curriculum, then there is an obligation to ensure that all learners studying that particular course/programme already have access to the instructional media-materials. Whether the media are integrated or not, their suitability should be given priority. Sparks (1982) identifies some of the factors that determine the suitability of the media. They are:

i) The place of media in educational feedback loop (i.e., whether they can be used for remedial tuition, identification of individual problems, etc.),
ii) Their suitability for different educational aims, different subjects, different kinds of teachers and students, and
iii) Their cost

The above mentioned principles may give us, at best, some general guidelines in selecting the media. The distance educators and the course designers should exercise their discretion and keep the specific needs of their institution in mind when they make media choices. Course ES-318 discusses media related issues in more detail.

3.6 LET US SUM UP

In this unit, we have:

i) described the implications, of the theories of learning and communication for distance learning, which we touched upon in units 1 and 2;
ii) pointed out the functions of a conventional classroom teacher, and how the self-learning materials may perform those functions;
iii) described the tasks of a distance teacher at various stages of developing self-learning materials for distance learning; and
iv) touched upon a few principles of selecting various media to be used for distance learning.

The ultimate outcome of our having dealt with items (i), (ii), (iii) and (iv) above has been arrived at a reasonably workable unit-design.

Check Your Progress: Possible Answers

1)i) Behaviourists advocated programmed instruction and self-pacing in learning. Various electronic devices were/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 point of view, 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 him/herself in terms of the successful completion of the learning activity.

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<table>
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<tbody>
<tr>
<td>2)</td>
<td>Gagné synthesised behaviourist and cognitive approaches to learning and provided a hierarchy of eight types/conditions of learning, ranging from simple to complex learning activities. Guided by these views the distance educator, while developing self-learning materials, presents the subject-matter as a sequence of its components ranging from simple to complex items in which every learning item is related to the previous one thematically and logically.</td>
</tr>
<tr>
<td>3)</td>
<td>Bloom thought of three domains of learning, viz., cognitive, affective and psychomotor. These domains guide a course designer in distance education to formulate learning objectives in behavioural terms. Further the learning objectives help in deciding upon the type of media to be used in distance learning/teaching.</td>
</tr>
</tbody>
</table>
REFERENCES


Postgraduate Diploma in Distance Education, Course ES-311 (1995) *Growth and Philosophy of Distance Education*, Staff Training and Research Institute of Distance Education, Indira Gandhi National Open University, New Delhi, India.


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Seibert, F., et al. (1956) Four Theories of the Press, University of Illinios Press, Urbana.


Dear Student,

While studying the units of this block, you may have found certain portions of the text difficult to comprehend. We wish to know your difficulties and suggestions, in order to improve the course. Therefore, we request you to fill out and send us the following questionnaire, which pertains to this block. If you find the space provided insufficient, kindly use a separate sheet.

**Questionnaire**

Enrolment No.

1. How many hours did you need for studying the units?

<table>
<thead>
<tr>
<th>Unit no.</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>No. of hours</td>
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2. Please give your reactions to the following items based on your reading of the block:

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<thead>
<tr>
<th>Items</th>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Poor</th>
<th>Give specific examples, if poor</th>
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<tbody>
<tr>
<td>Presentation Quality</td>
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<td>Language and Style</td>
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<tr>
<td>Illustrations Used (diagrams, tables, etc.)</td>
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<td>Conceptual Clarity</td>
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<td>Check Your Progress Questions</td>
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<td>Feedback to CYP Questions</td>
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</table>

3. Any other comments:

Mail to:
Course Coordinator (ES-312)
STRIDE, IGNOU, Maidan Garhi
New Delhi – 110068, India.