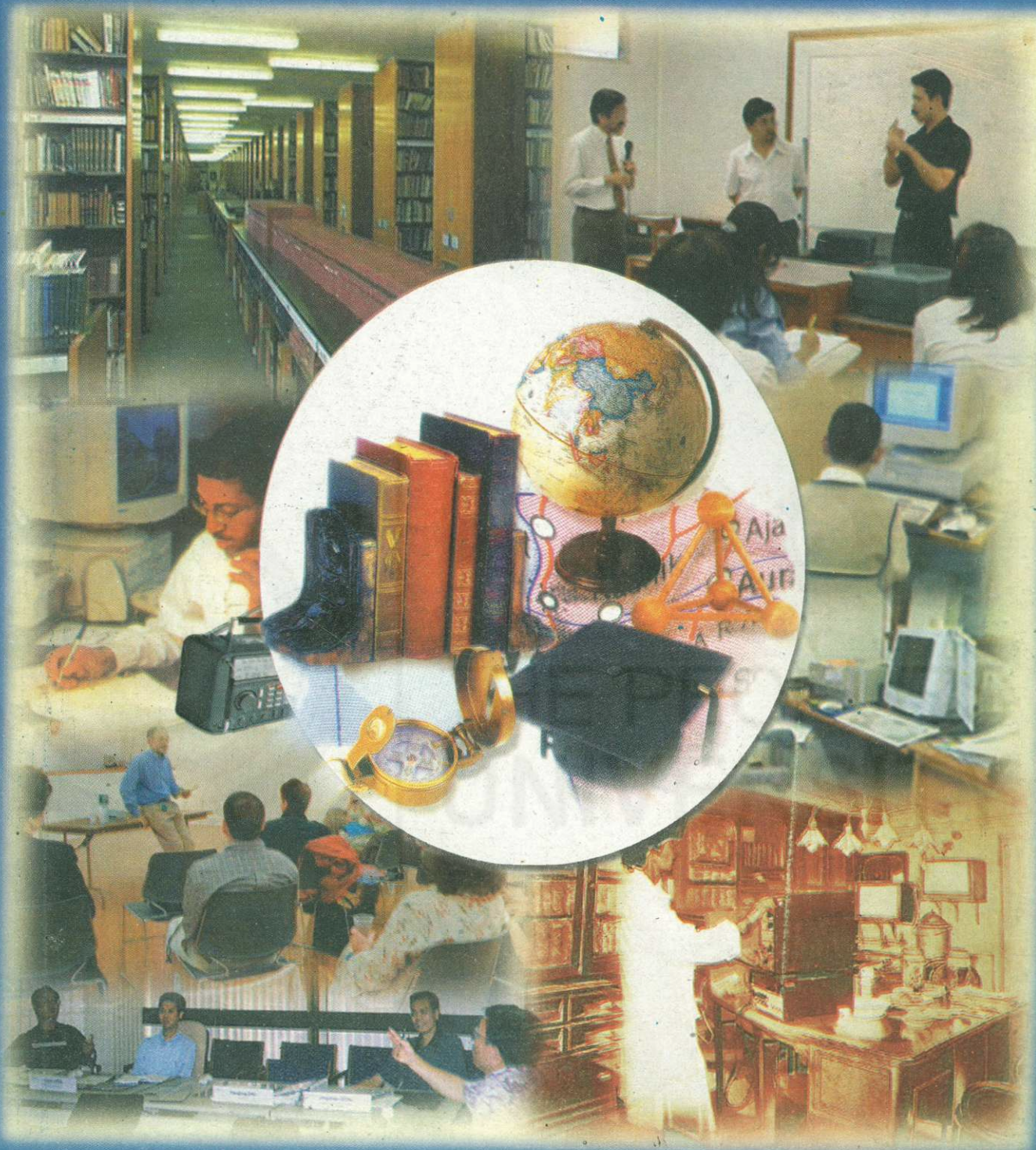




Indira Gandhi National Open University
School of Education

MES-102
Instruction in
Higher Education



Instruction in a Systemic Perspective 1

"Education is a liberating force, and in our age it is also a democratising force, cutting across the barriers of caste and class, smoothing out inequalities imposed by birth and other circumstances."

— Indira Gandhi



“शिक्षा मानव को बंधनों से मुक्त करती है और आज के युग में तो यह लोकतंत्र की भावना का आधार भी है। जन्म तथा अन्य कारणों से उत्पन्न जाति एवं वर्गगत विषमताओं को दूर करते हुए मनुष्य को इन सबसे ऊपर उठाती है।”

— इन्दिरा गांधी



MES-102

Instruction in Higher Education

Block

1

Instruction in a Systemic Perspective

UNIT 1

Instructional System

7

UNIT 2

Input Alternatives — Teacher Controlled

26

UNIT 3

Input Alternatives — Learner Controlled

46

UNIT 4

Evolving Instructional Strategies

73

UNIT 5

Unit and Topic Planning

91

COURSE TEAM

Course Contribution

Prof. M.B. Menon
Former Director, SOE, IGNOU
Presently Teacher Education
Specialist, COL, Vancouver

Prof. S.S. Kulkarni
Narayan Ashram
Koloshi, Sindhudurg
Maharashtra

Dr. P. Arun Kumar
Technical Teachers'
Training Institute
Chennai

Dr. N.K. Dash
SOE, IGNOU

Coordination

Dr. N.K. Dash
(Course Coordinator)
SOE, IGNOU

Prof. S.B. Menon
(Programme Coordinator)
Former Director, SOE
IGNOU
Presently Dean, CIE
University of Delhi, Delhi

Prof. B.N. Koul
(Programme Coordinator)
Former Director, SOE
IGNOU

Prof. M.B. Menon
(Programme Coordinator)

Editing

Prof. S.S. Kulkarni
(Course Editor)

Prof. M.B. Menon
(Associate Editor)

Dr. N.K. Dash
(Content Transformation and
Format Editing)

Ms. Jayshree Raveendran
(Language Editing)
Formerly with IGNOU

COURSE TEAM (REVISED VERSION)

Course Contribution

Dr. N. Pradhan
Department of Educational
Administration
M.S. University, Baroda

Dr. K. Pushpanadham
Department of Educational
Administration
M.S. University, Baroda

Dr. N.K. Dash
School of Education
IGNOU

Course Coordination

Dr. N.K. Dash
(Course Coordinator)
School of Education
IGNOU

Ms. Poonam Bhushan
(Programme Coordinator)
School of Education
IGNOU

Format Concept and Design

Ms. Poonam Bhushan
(Programme Coordinator)
SOE, IGNOU

Prof. S.V.S. Chaudhary
Director, SOE
IGNOU

Dr. N.K. Dash
SOE, IGNOU

Acknowledgement : We acknowledge Mr. R.K. Laxman for reproducing his cartoons.

PRODUCTION

Prof. M.L. Kaul
Director
School of Education
IGNOU, New Delhi

S.S. Venkatechalam
A.R. (P)
School of Education
IGNOU, New Delhi,

M. Sumathy Nair
S.O. (P)
School of Education
IGNOU, New Delhi

December, 2008 (Reprint)

© Indira Gandhi National Open University, 19

ISBN-81-266-0952-4

All rights reserved. No part of this work may be reproduced in any form, by mimeograph or any other means, without permission in writing from the Indira Gandhi National Open University.

Further information on the Indira Gandhi National Open University courses may be obtained from the University's Office at Maidan Garhi, New Delhi-110068.

Printed and published on behalf of the Indira Gandhi National Open University, New Delhi, by the School of Education, IGNOU, New Delhi.

Laser Typeset : Rajshree Computers, 5A/177, W.E.A., Karol Bagh, New Delhi-110005

Printed at M/s. Apex Printer, WA-117A, Shakarpur, Delhi-110092

MES-102 *Instruction in Higher Education*

Block 1 *Instruction in a Systemic Perspective*

- Unit 1 Instructional System*
 - Unit 2 Input Alternatives -- Teacher Controlled*
 - Unit 3 Input Alternatives -- Learner Controlled*
 - Unit 4 Evolving Instructional Strategies*
 - Unit 5 Unit and Topic Planning*
-

Block 2 **Communication Skills**

- Unit 6 Teacher Competence in Higher Educaiton
 - Unit 7 Skills Associated with a Good Lecture
 - Unit 8 Skills Associated with the Conduct of Interaction Sessions
 - Unit 9 Skills of Using Communication Aids
 - Unit 10 Emerging Communication and Information Technologies
-

Block 3 **Evaluation Perspectives in Higher Education**

- Unit 11 Status of Evaluation in Higher Education-I
 - Unit 12 Status of Evaluation in Higher Education-II
 - Unit 13 Status of Evaluation in Higher Education-I
 - Unit 14 Status of Evaluation in Higher Education-II
-

Block 4 **Evaluation in Higher Education : Mechanics and Processing**

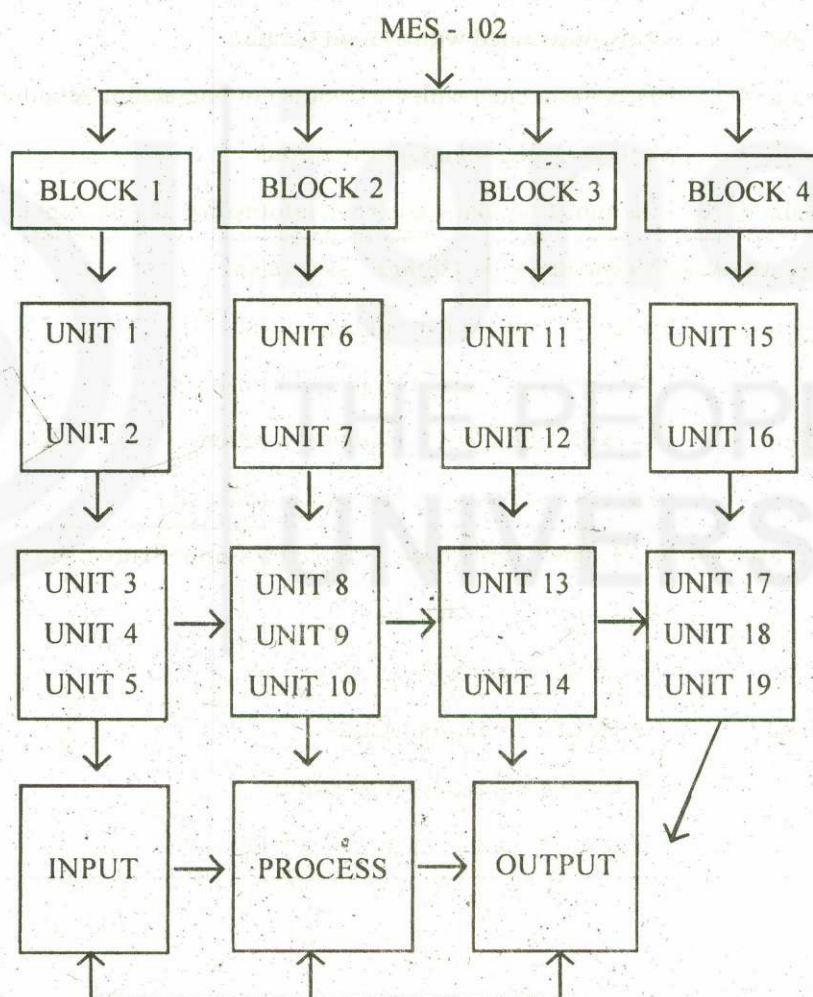
- Unit 15 Mechanics of Evaluation -I
 - Unit 16 Mechanics of Evaluation -II
 - Unit 17 Processing Evaluation Data
 - Unit 18 Alternative Evaluation Procedures
 - Unit 19 Online/Web-based Student Assessment
-

MES-102 *Instruction in Higher Education*

Introduction to the Course

Teacher training at the higher education level is gradually gaining acceptance everywhere. The basic assumption behind this is that, teaching is a systematic and organised endeavour where the practitioner (teacher) needs a thorough orientation. A higher education teacher, in order to be more effective, must know both the macro and micro dimensions of higher education. By macro dimensions, we mean the philosophical historical and sociological bases of education. These we have already discussed in MES-101. Our concept of the micro level dimensions centres around the basic unit of higher education -a college or a university -and the instructional activities going on in these institutions. We shall specifically study about the students and the management of higher education in courses MES-103 and MES-104, respectively.

A Systems Approach to Designing the Course II -MES 102



In MES-102 our thrust will be on the instruction in higher education. While designing this course, we have followed a system's perspective (see the Figure above). We discuss in detail the concept of a system and its components in Unit 1 and to make our intentions explicit, we mention here the basic components of a system viz. input, process and output. Throughout the course we will hence, address instruction as a system. An instructional system requires a number of inputs in terms of teachers' competencies, learners' background, infrastructural facilities, curriculum, etc. With a view to operating these inputs, the instructional system uses varied processes which require teaching/ communication skills, student's active involvement and procedures for the utilisation of infrastructural

facilities and curriculum. The output of instructional process namely the instructional outcome, is to be evaluated in order to understand the effectiveness of the system for achieving these outcomes (instructional objectives).

Block 1, thus, deals with instruction in a systems perspective. Here we define the concept of a system and analyse a classroom system from the system's angle. Mainly, we concentrate on input alternatives, both teacher controlled and learner controlled. We also discuss how to evolve instructional strategies and how to develop unit and topic plans to bring about optimum learning.

Block 2 deals with the teacher's competencies and communication skills to carry out the instructional functions. Here, we describe lecturing skills, skills of conducting interaction sessions and skills of using communication aids. These are the skills which a teacher of higher education would require in order to put the various instructional inputs into practice with a view to achieving his instructional objectives. We also present emerging communication and information technologies not will form the past of higher education.

Blocks 3 and 4 deal with evaluation of the output of instruction process. While we present you with the meaning, varieties, uses and status quo of evaluation in Block 3, we discuss the mechanics and processing involved in evaluating the instructional outcome, in Block 4. Thus Block 3 starts with the meaning and uses of evaluation and throws light on the present day examinations and on their loopholes and suggests a number of examination/evaluation reforms. We then go on to give a different classification of evaluation and also evaluation in specific areas of instruction like evaluation of lab work, seminars, dissertations and internal and external evaluation.

Block 4, in the beginning, points out the elements that are taken into account in preparing a test or a question paper. It then highlights on the major characteristics of a test and on how to prepare a question bank. In the next half of the Block, we discuss the analysis of both quantitative and qualitative data. In this context, we present some basic statistics. We also discuss on how the results of a test or an examination are made use of by different beneficiaries -students, parents, institutions, society and the like, and in this context, we relate what can be a more meaningful reporting procedure. At the end, we provide how student assessment can be done online.

Block 1 *Instruction in a Systemic Perspective*

Introduction to the Block

We have already mentioned in the Course Introduction, that we deal with this Course from a system's perspective. Hence we start Block 1 with input component of an instructional system. Here we try to present you with the meaning of an instructional system and its major components, the various input alternatives that have been broadly classified into teacher controlled and student controlled, and also how to evolve instructional strategies. A brief mention about lesson planning/topic planning has also been put in here.

In Unit 1, we define the meaning of learning and instruction and differentiate between them. We then bring the concept of a system and explain how a system does operate. In this context, we examine classroom instruction from a system's perspective and identify three major components -input, process and output - of an instructional system. We too discuss the basic concerns involved in developing an instructional strategy. On the whole, the unit has been designed to act as a mirror to the entire course.

Unit 2 deals with input alternatives -teacher controlled. It talks mainly about three teacher controlled instructional techniques, namely, lecture, demonstration and team teaching. We analyse the instructional potentials of these techniques as well as discuss how best they can be utilised in day-to-day classroom teaching.

Unit 3 consists of student controlled and group controlled instructional techniques. The first part of the unit is devoted to student controlled instructional technique, wherein we talk about different forms of self learning methods-structured and partially structured. Under the structured category, we discuss programmed learning material, personalised system of instruction and computer-assisted instruction. We bring in project work under partially structured category. The second part of the unit is on group controlled instructional techniques. Under this, we describe the condition, organisation and instructional potentials of some interaction sessions. We also discuss cooperative learning and group investigation methods.

Unit 4 explains how an instructional strategy is evolved. In the beginning, we define the concept of an instructional strategy. Thereafter we provide you with the steps through which an instructional strategy is developed. In this context, we present a detailed discussion on educational goals and instructional objectives. We also bring in cone of experience which gives you yet another perspective for evolving strategies.

Unit 5 tells you how to prepare a plan for a unit as well as for a topic or lesson.

Instructional System

Introduction

The primary objective of higher education is to make the students reach the frontier of knowledge. Therefore, teaching them is the main job of teachers of higher education. The universities and colleges, therefore, have different instructional processes involving different materials, styles approaches. These processes are developed by teachers themselves to make the students learn. To make the students learn in a better way, there is a need of materials, gadgets, personnel, time, and space, etc. The scientific arrangement of all these components in proper order and their implementation only will cause effective learning. The proper arrangement of components to make the students learn and teachers teach is instructional system.

The present unit presents the various aspects of instruction, supported by suitable illustrations and the development of the instructional system. The unit also presents the introductory framework or perspective for the subsequent units of this course.

Learning outcomes

At the end of this unit, you will be able to:

- state the meaning of instruction and instructional system;
- interpret the concept of a system as an aggregation or assemblage of elements united by their interaction and interdependence, to form a whole;
- interpret the instructional system using the input-output model;
- describe the meaning of systems approach with illustrations;
- enumerate the various stages involved in the systems approach to instruction;
- identify the elements of a given instructional system;
- state the various considerations for selection of instructional inputs;
- explain the concepts of effectiveness and efficiency in the context of instruction;
- describe the roles of a teacher in instruction as that of an input and a systemist;
- apply the concepts of systems approach to instruction, to improve on the existing systems and evolve new systems; and
- identify the inadequacies/inefficiencies/ineffectiveness in a system.

Learning and instruction

Learning and Instruction are terms used commonly in classroom situations. Let us see what these mean.

Learning

Learning is a term we use quite often to express varied things. We, as teachers, are interested to see that all students learn well. You may be a teacher in a college or university.

Or, you may be one who is interested in entering the teaching profession. In any case, all of us have the experience of learning. You would surely have our own understanding about learning. Why don't you try to express your own definition of learning?

Activity

1. What is learning ?

.....

.....

.....

.....

.....

You might have defined learning as one or more of the following or something similar to any of these:

- knowing laws and definitions;
- being able to perform certain things such as experiments, calculations etc.;
- being able to read, write, speak and comprehend a language;
- being able to solve problems or make decisions applying knowledge;
- memorization.

Yes, you are in the right direction. All these and many more, take place due to learning.

What is learning? How does it take place? What are the conditions required for learning? These questions are discussed in detail in Course 3 or in any book on psychology of learning. In this Unit we may not discuss these issues in such detailed manner; however, some clarification in this regard may be necessary. There are different schools of psychology looking at the learning process differently. The Behaviourists' School of Psychology explains learning as a change in the behaviour of individuals. The Cognitivists' School of Psychology considers learning as a change in cognitive structure of the individual. The constructivists view learning as the construction of new learning experiences by the learner which is a result of the interplay between cognition and the social context in which the learner is situated. We may not debate on this issue here, but will consider both the views for giving a simple definition for learning. Learning may be regarded as a change in behaviour and in the cognitive structure of an individual. In other words, when an individual learns, he shifts from an initial cognitive structure with its corresponding behaviour, to a different cognitive structure and its corresponding behaviour.

Suppose a student understands the reasons for the spread of a contagious disease and the need of taking precaution against the disease which he did not understand earlier. Now that he understands, he will take all the precautions for that disease. This will, therefore, be reflected in his behaviour. Further, when certain acts are performed, he will know and understand certain other aspects of the phenomenon. So change in cognitive structure and change in behaviour of individual are complementary to each other.

The second question still remains. How does learning take place? Let us see what explanation the Behaviourists' School of Psychology has, for this question. Learning in

an individual does not take place in isolation. The individual interacts with one or more components in the environment which result in learning. Let us now examine this process of learning in more detail.

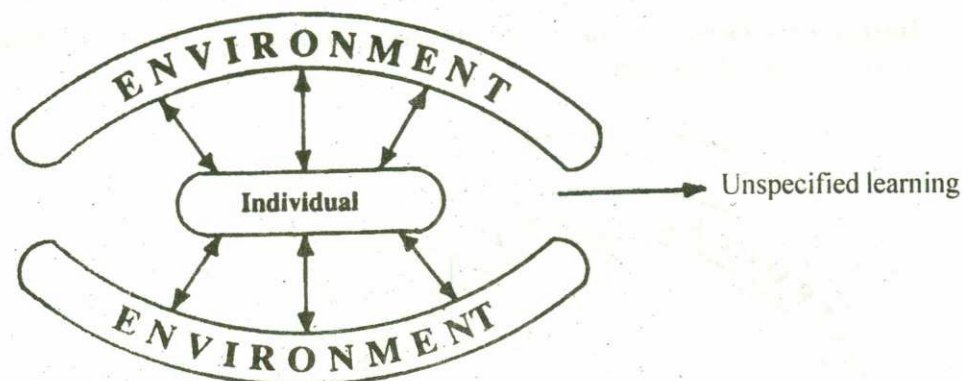


Figure 1 : Learning in natural environment

As you know, environment consists of living and non-living things. For an individual, everything other than him/her is part of the environment such as air, water, food, light, wind, plants, animals, other human beings, and many more. Take the example of a child. He interacts with various sounds existing in the environment, and tries to imitate and utter similar sounds. He learns many things through the interaction. While he learns many new things from his elders; his elders also learn by interacting with the child. Hence, when an individual interacts with another individual in his environment and learns, for the second individual, the first one is part of the environment.



Figure 2 : That boy Isaac Newton will never learn! He sits under that tree every day and gets hit by falling apples!

Courtesy : R.K. Laxman

In college and university also the students learn by interacting with teachers, classmates, equipments, chemicals and other such components that are designed purposively to cause students' learning. This type of learning generally happen in a formal way and, therefore, many experts called it as formal learning.

Instruction

In a natural environment an individual interacts with the components of the environment in an informal and unorganised manner, leading to unanticipated or unspecified learning. However, attaining pre-specified and desired learning would depend upon the provision of a controlled environment for the individual to interact with. Instruction involves the provision of a controlled environment with which the individual will interact leading towards the attainment of certain pre-specified learning outcomes or instructional objectives.

Hence, instruction may be considered as a process of providing a controlled environment consisting of various components with which an individual/individuals interact and gain experience, leading to their attaining certain pre-specified learning outcomes.

Instructional Objectives Individual in Close interaction ----- Attainment of Instructional objectives.

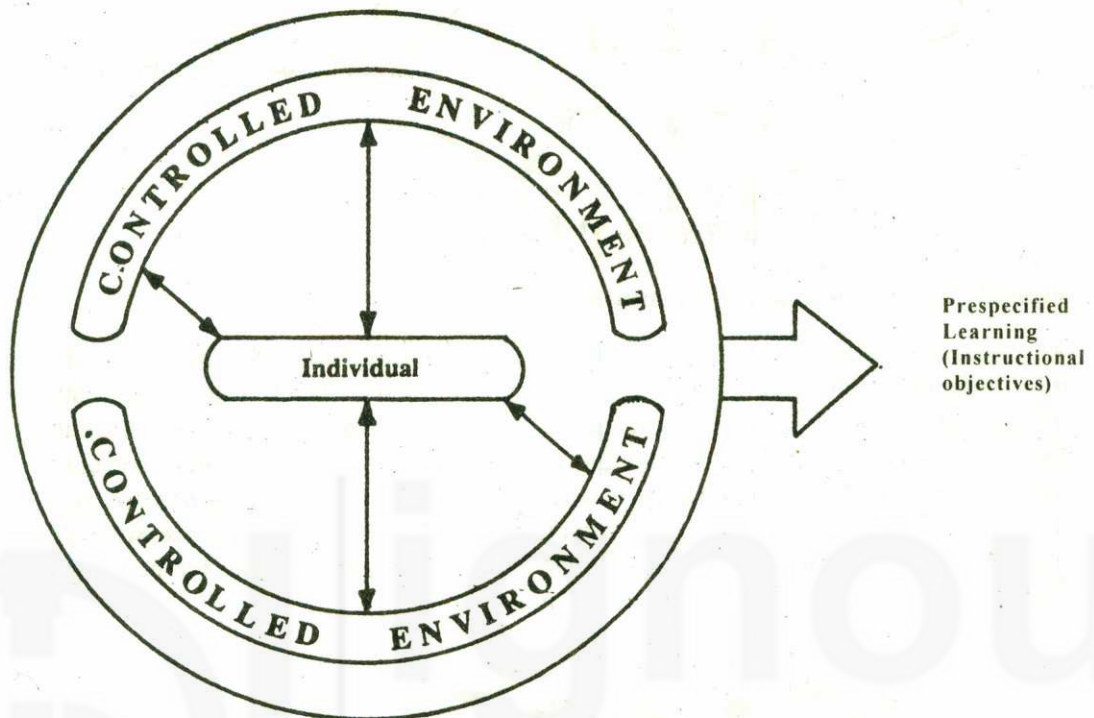


Figure 3 : Learning in controlled environment

The main contention is that an interaction between an organism and its environment changes not only its outward (overt) behaviour but also the internal cognitive structure. And this change may affect the present response as well as the future orientation to the environment. This implies that this process has led to development or modification in the conceptual structure. The organism (learner) assumes an active role in its interaction with the environment. And hence, the controlled environment provides a congenial and facilitating influence on the learner to develop within his cognition, his own unique conceptual schemes and logical structures. (Refer Course 3 for more details on concept of learning)

We discussed a lot about controlled environment. One may accept the Behaviourists' explanation of learning or that of the Constructivists or the Constructivists. In all cases, for learning to take place organisation of an environment becomes essential. As a teacher how would you organise this environment?

Activity

2. List the specific things you will include in your learning environment for teaching any topic from the subject of your choice.

.....

.....

.....

.....

You might have listed so many things. Some of you may like to give a lecture, organise a discussion on certain major issues, give a demonstration of an experiment, assign an activity for the students, and suggest a couple of books for them to read from the library and so on. Others might have also similar things. But, why you think these different activities are to be organised for the students at all?

You may say that all these are needed for learning. Each of them has its own function and thus all are useful. The lecture will give them some information, the discussion will help in clarifying the issues and developing a higher level of thinking, the library reading will provide additional information and so on. It is also obvious that the points clarified in the discussion are related to the information given in the lecture and additional information that obtained through the library reading. Such relationships would be there among other components too. Hence, you may find that the various activities you decide to organise have interrelationships and interdependence. This controlled environment which you have tried to generate for the learning of students, is attaining the form of a system. Let us discuss more about systems in the next section.

Self - assessment

1. Encircle the most appropriate answer.

- i) Learning takes place in an individual in
 - a) only natural environment
 - b) controlled environment
 - c) both natural and controlled environments
- ii) Both Cognitivists' and Behaviourists' schools agree on
 - a) changes in the cognitive structure
 - b) the learner being a passive organism
 - c) behaviour change as the most significant aspect in learning
 - d) provision of suitable environment for learning
- iii) In college and university, teachers mostly provide
 - a) nothing and the students learn anything in any manner.
 - b) a controlled environment for students' learning.
 - c) natural environment for students' learning

2. Assume that you are preparing to teach a unit from your subject to undergraduate students. List at least 5 components you would include in the controlled environment that you would organise.

Concept of System

Let us try to understand what is meant by a 'system'. For this we may take the example of a car. What are the different parts of a car? The brake, steering and clutch are three parts.

Activity

3. List a few more parts of a car.

Yes, there are many more parts. The gear, the radiator, the battery, the wheels, the carburetor, and the ignition are a few more. There are some more parts and, all these together become a car. One may ask that why we need all these parts. All these parts are required for the car to perform various functions. And hence, all these are '**components**' of the car,

Suppose the gear is not working properly or, suppose the break is not working, in either cases the car will not be able to perform its functions properly. Thus, it is clear that if any component of the car does not function properly, it affects the functioning of all the other components and that of the whole car. This shows that the components are interrelated and interdependent operating towards the car's effective functioning.

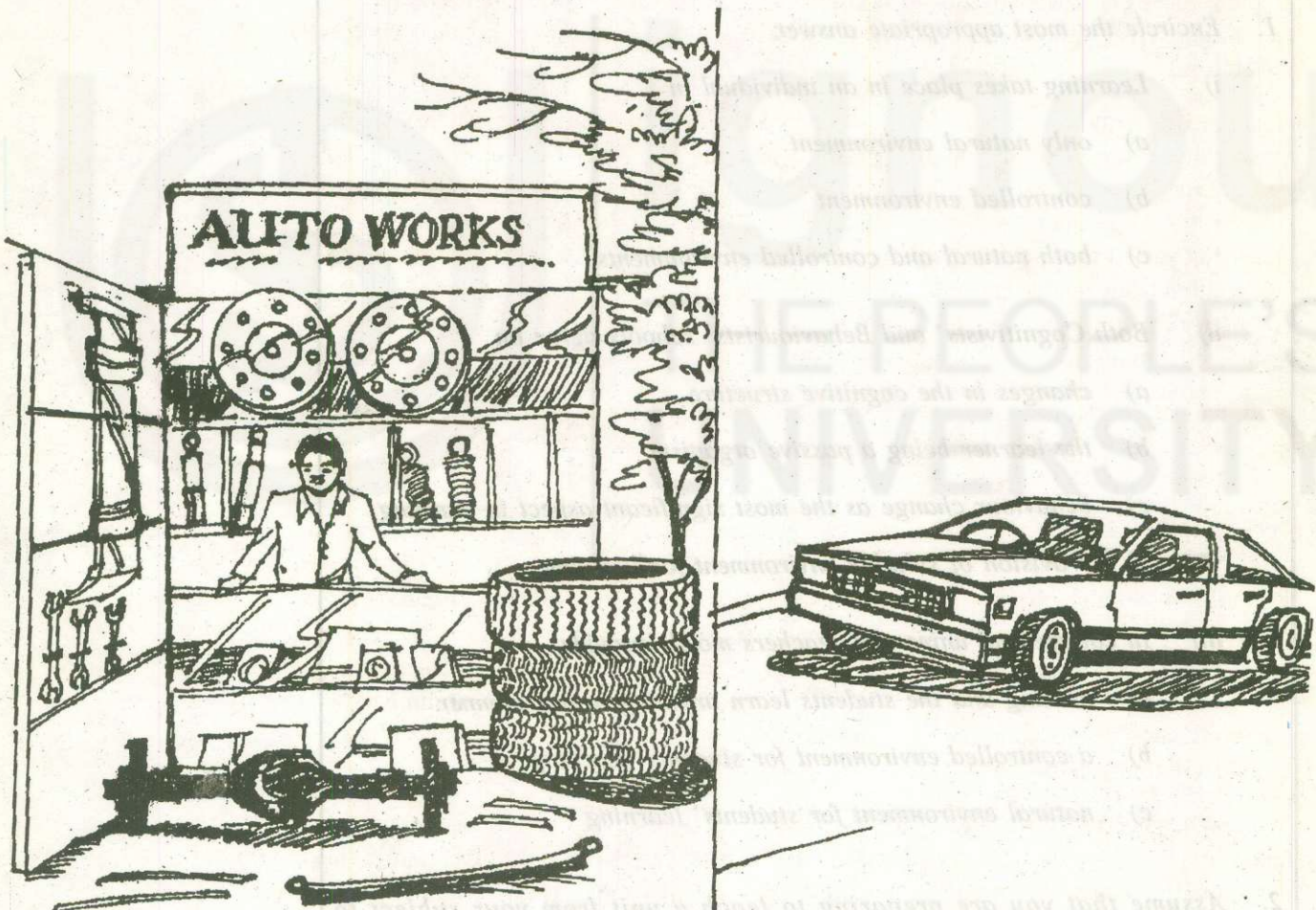


Figure 4: Components of a car — Not a system, A complete car — A system

It may be seen that we are slowly developing the concept of a system with the example of a car.

Activity

4. From our discussion, mention the major characteristics of the car as a system

.....

.....

.....

.....

.....

Yes, most of you must have mentioned the following:

A car has certain functions to perform.

It has a number of components which operate together.

The components operate in an interrelated and interdependent manner towards the effective functioning of the car.

With all these characteristics, a car becomes a system. Thus, a system has a number of components operating together in an **interrelated** and **interdependent** manner towards the attainment of certain functions.

Suppose we start a car and set it into motion by suitably fixing the gear and adjusting the accelerator at the beginning and allow it to move in without the driver. Yes, if it is a straight road, it will go on moving. But will it be able to react to any thing that happens outside it, such as another car coming, a person walking in the front or a turning in the road? No, it will not. The car without a driver as part of the system cannot take in any information from outside and adjust it accordingly. Thus, it may be called a closed system. A closed system is one which does not accept new information and which has become detached from interfacing with other systems outside.

Now, let us consider the car along with the driver as one system. In this case, the system becomes better suited for turning the car when the road has a turn, or stopping the car when there is an obstacle of some sort. Thus the system, consisting of the car and the driver, together becomes an open system. An open system is one which accepts information from its interfacing systems and is capable of adapting to new circumstances.

From the above discussion it may be clear that a system does not work in a vacuum. It is surrounded by other systems with which it has to interact. These form the environment of the system or system environment. There is flow of information between an open system and the environment and it adapts itself to the needs generated by the environment. On the other hand the closed system does not accept new information from the environment and thus remains detached to it.

We saw earlier that in the case of the car as a system there are many constituting components viz. gear, carburetor, brake, etc. Each of these components, by itself, has separate functions to perform and consists of various parts within it. A gear for example has a gear handle, different teeth wheels for different gears, etc. This means that the gear also has the characteristics of a system. And, hence the different components may be seen as the **sub-systems** of the main system. Each of them on its own may be considered as systems such as the gear system, oil flow system, and the brake system.

Hence, for an integrated set of components, to be considered as a system or a sub-system, is a relative matter. If one considers the car as a system, the gear, brake, etc. become sub-systems. But, if one considers the gear chamber as a system by itself, then the other components of the car become the environment of the gear system.

The whole operation of the car is to attain certain objectives, viz. environment, change of speed, stopping, etc. These are some of the **system goals** of the car. All systems come into existence for achieving some goals. The performance of the system is judged by seeing of the achievement of the system goals.

The human body is a complex system. It constitutes sub-systems such as digestive system, circulatory system, skeletal system, nervous system, etc. Each of these sub-systems has well defined parts which are related. The collective functioning of these systems keeps the human body fit and healthy. So also is the case with an orchestra party. If each component of the party does not function, it becomes an incomplete system.

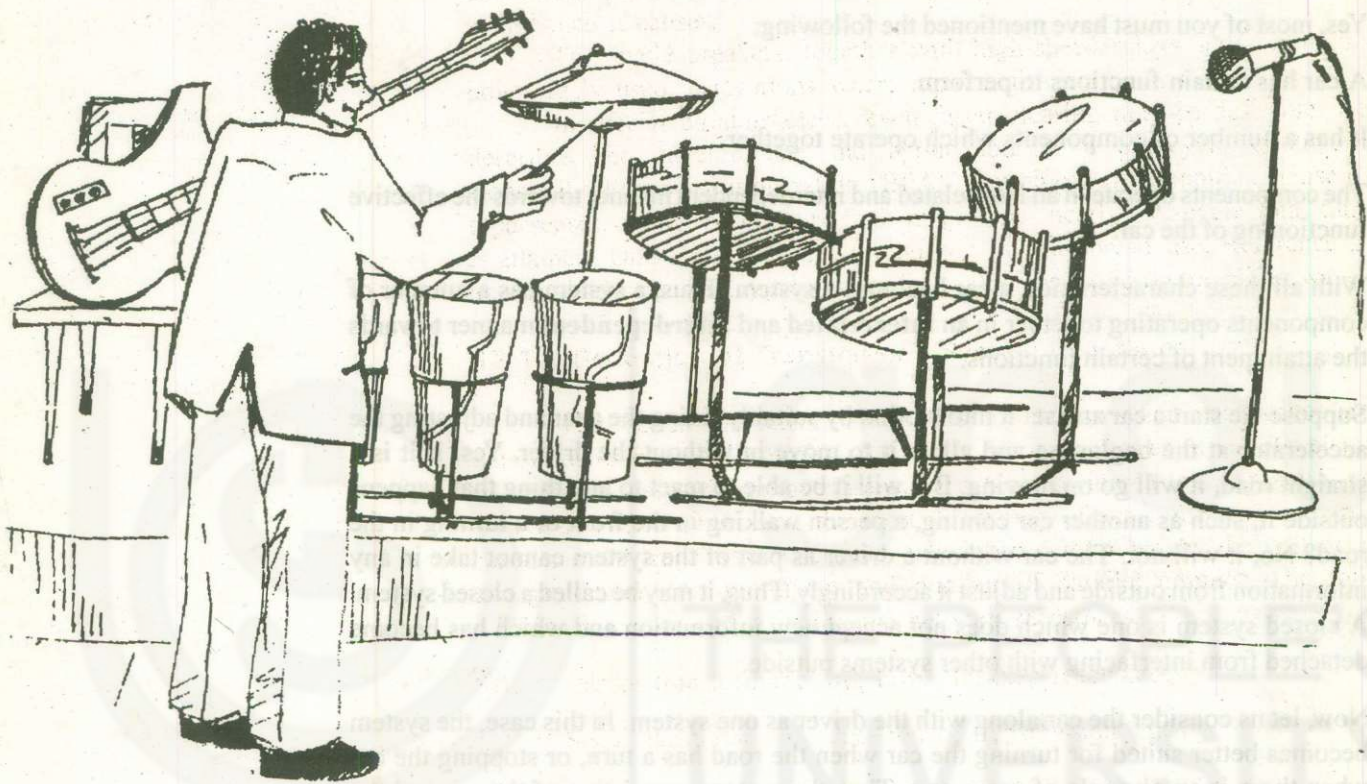


Figure 5 : An incomplete system

Whether a car or a human body, if a system has to function effectively, it should achieve its pre-determined goals.

Let us take a look at a new example of system -a cloth mill. What is expected of a cloth mill? We all know that the cloth mill produces cloth. So, cloth is the product from the cloth mill. As the product comes out of the system, we may call it as the output. We know (even if we are not textile engineers), that to produce finished cloth one requires some raw material, machines and chemicals. These are put into the system and hence these may be called the Input. The required raw material and chemicals are processed in the machines and later they weave the cloth.

INPUT → PROCESS → OUTPUT

How does one decide the input material and design the process of manufacture of cotton cloth? Naturally, the nature and type of the input material would depend upon the type of cloth one wants to produce. But, if the expected type of cloth is not produced even after the inputs are put through the process, what does this show? It shows that the design of the process is not proper. Hence, the **expected output** is the main criterion in deciding the nature of the input material and the design of the process. The selected input material goes through the designed process to produce the **actual output**. The actual output need not always be exactly same as the expected output. The difference between the two

provides information for either the modification in the selection of inputs, or the designing of the process. In other words, this information is the feedback provided to the selection of inputs and the designing of the process.

The following diagram attempts to consolidate the various aspects of the cloth manufacturing system with the help of the **input-output model**.

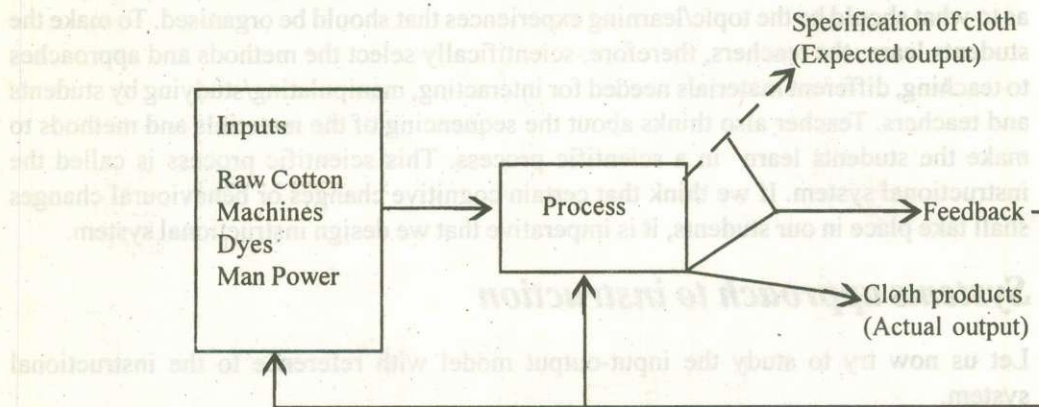
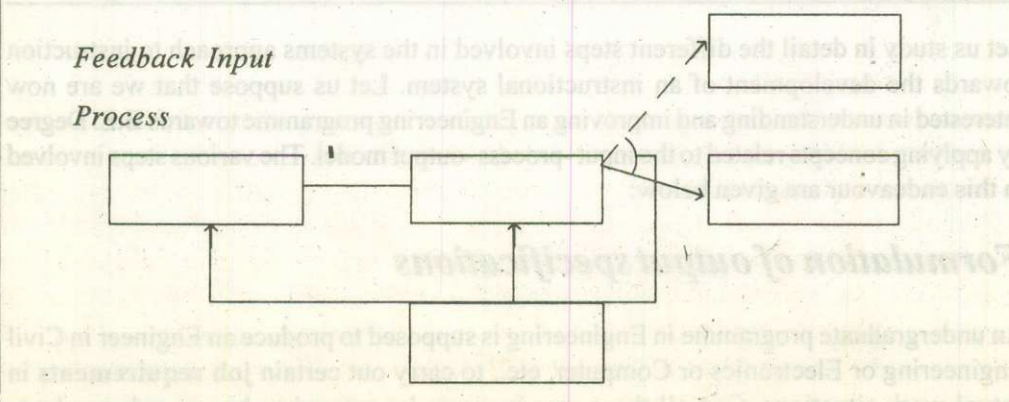


Figure 6 : Input-output model

In the preceding section we had a discussion on the systems approach to an industrial situation with the example of a cloth manufacturing system.

Self-assessment

3. A few statements are given in the following. Put a tick (✓) against those statements which are true of the concept of system and put a cross (×) against those which are not true.
 - i) Every system consists of interrelated interdependent components.
 - ii) The open system is an unchangeable entity.
 - iii) Closed system interacts with the environment.
 - iv) A system is surrounded by the environment with which it interacts.
 - v) System works with definite set of goals.
 - vi) When inputs are processed outputs are expected to be produced.
 - vii) Driver in a car changes the nature of the system.
4. Complete the gaps in the following system model using the terms given here:
Expected output Actual output



Instructional system

Students in the educational system are subjected to many situations to learn various things. These situations are developed deliberately by the teacher. Even before thinking about the topic to be learned and how the students will learn, the teachers think as to what will be the objectives that should be attended by the students. Then only the teacher may think as to what should be the topic/learning experiences that should be organised. To make the students learn, the teachers, therefore, scientifically select the methods and approaches to teaching, different materials needed for interacting, manipulating/studying by students and teachers. Teacher also thinks about the sequencing of the materials and methods to make the students learn in a scientific process. This scientific process is called the instructional system. If we think that certain cognitive changes or behavioural changes shall take place in our students, it is imperative that we design instructional system.

Systems approach to instruction

Let us now try to study the input-output model with reference to the instructional system.

The meanings of instruction and learning are mentioned at the beginning of this module. Instruction involves the interaction of an individual with the organised environment leading towards the attainment of certain instructional objectives. In other words, when students with a certain type of behavioural pattern (and cognitive structure) go through the instructional system, they come out with a changed pattern of behaviours (and cognitive structure). Quite simply, we can say that the students enter the instructional process with certain behaviours. These behaviours can be termed as **entry behaviours**. They are expected to achieve certain terminal behaviours which can be termed as **expected terminal behaviours**. The instructional process is designed in such a manner as to achieve the expected terminal behaviours. We may, thus, say that the expected terminal behaviours are what we intend to achieve in students through an instructional process and that the **actual terminal behaviours** are what they actually achieve. The difference between the expected and actual terminal behaviours is due to the lack of effectiveness in the instructional process. Thus, the difference between the expected and the actual terminal behaviours would act as feedback. In this model, the entry behaviour is the input and the actual terminal behaviour is the output of the instructional system.

Activity

5. Identify the inputs, outputs and the process in an instructional system.

Outputs:

Inputs:

Process:

Let us study in detail the different steps involved in the systems approach to instruction towards the development of an instructional system. Let us suppose that we are now interested in understanding and improving an Engineering programme towards B.E. Degree by applying concepts related to the input-process-output model. The various steps involved in this endeavour are given below:

Formulation of output specifications

An undergraduate programme in Engineering is supposed to produce an Engineer in Civil Engineering or Electronics or Computer, etc., to carry out certain **job requirements** in actual work situations. Can all these requirements be catered to by an undergraduate

programme? Surely not. Training in certain areas of the job such as those involving very new technologies could be mastered only in the actual job situation. However, the majority of the job requirements have to be catered to by the engineering programme and thus should be reflected in the **output specifications**. But, one need not necessarily start right from scratch as the students enrolled to the programme might have already attained some knowledge and competencies through their formal education upto the higher secondary level and also through informal learning. Hence while formulating the output specifications for the engineering programme, the level of the students or their entry behaviour at the time of enrollment, has to be kept in view.

Once the task to be achieved by the students is decided, analysis of the task should be done in terms of concrete changes in behaviour. This process of analysing the task involves, defining specifically, the instructional objectives into observable **terminal behaviours**. These terminal behaviours which are expected from the students after going through the instructional systems are the output specifications of the system. As mentioned earlier, these output specifications help to design the **instructional system** for the engineering course. Thus, in the development of an instructional system, the first step is task analysis with which to formulate the expected terminal behaviours.

Preparation of the criterion test

How will we know, after going through the instructional process, whether the students have achieved the expected terminal behaviours or not? Yes, the students will have to be tested for it. For this, tests have to be prepared with items representing the expected terminal behaviours right at the beginning, just after the terminal behaviours have been formulated. You may wonder why this is necessary; this is because each terminal behaviour should be represented by an item in the prepared test. It is to be ascertained that these tests contain items which represent all the terminal behaviours. As these items in the test form the criteria of understanding whether all expected terminal behaviours have been achieved or not, the test can be called a criterion test. Hence, the second step in the development of an instructional system is the preparation of criterion test.

Formulation of instructional input alternatives

Now, that we have formulated the objectives and proposed the criterion test we should think of the inputs. A teacher in an engineering programme can think of large number of methods, media and material to achieve the objectives visualised. Many of these may be available to the teacher. But how does one go about it?

Let us try to identify the different inputs which can provide the suitable learning experiences towards the achievement of instructional objectives. This may lead to a lot of overlapping and repetition in the sense, that more than one may be identified in the achievement of a single objective. In other words, there may be instructional input alternatives identified. But this is not to be avoided; rather, it is necessary to have these alternatives which form the alternative inputs for the instructional system. Let us take an example. A lecture and a well prepared written material of the type you are going through are both found to be having the potential to impart knowledge in the concerned engineering subject to the students. Hence, both these techniques are alternative ways of imparting knowledge. Or in other words, they are alternative instructional inputs to achieve the same instructional objective. There are also other instructional objectives to achieve in an engineering course such as, the development of application ability, and the inculcation of skills. There could also be alternative instructional inputs identified for each of the other instructional objectives. Thus the third step to be followed in developing an instructional system is ***the formulation of instructional input alternatives***.

Selection of the 'best' set of inputs

It is obvious that, in a given instructional situation, we cannot or need not, use all these alternative inputs. For example, why should we have long lectures when the same thing is provided as written material and the very same material narrated in an audio cassette? Yes, one need not have all these in the system. One should select the best set of instructional inputs from the alternatives available, so that after formulating the input alternatives, the selection of the 'best' set of inputs should be carried out. Thus the fourth step involved in the development of an instructional systems is the selection of the 'best', or the most suitable instructional inputs. The considerations for selection of instructional inputs are discussed in a separate section.

Preparation of learning material

Let us suppose that you have selected lecture, discussion, assignment and practical work for your instructional situation. Each of these would require some material to be used when it is organised. Once the 'best' instructional inputs are selected, the learning materials should be prepared considering the terminal behaviours and the nature of the selected input. These learning materials should be very comprehensive. These go into the specific situations of learning and hence, their development should take into account, their terminal behaviours. Proper care is to be taken to ensure that learning activities are developed and presented in suitable sequences, facilitating effective learning. Logical continuity can be attained by proper sequencing of the learning experiences. Thereby, the fifth step in the development of an instructional system, is the preparation of learning material.

Laboratory tryout

Now, we have decided the components of the system and the necessary material. But, how do we know that it would work? After the development of the instructional system, one should find out whether the system is effective in terms of achievement of objectives. Details about the **effectiveness** and **efficiency** are discussed in a separate section. Effectiveness of the developed instructional system should be determined by testing it in a manner similar to that of the laboratory. This forms the first step in the testing phase in the developmental process of an instructional strategy. Thus the initial testing of the system is known as the **laboratory testing** or **laboratory tryout**. Laboratory tryout being the initial tryout, the sample may be small. But, this sample should be a representative one of the population of persons for whom the strategy is developed.

Field tryout

After the tryout on a small sample and subsequent revisions, the system should be tried out on a large sample. We are now taking the instructional system from the laboratory to the field. This is known as field tryout. It is possible that a few mistakes are identified after the field tryout. These mistakes are to be rectified and thus the system has to be revised.

Revision and outcome

Revision takes us to the final form of the instructional system. But this does not mean that the system is now perfect. However, as far as the developmental process is concerned, this revision, after the field tryout, leads to the final form of the instructional system. However, after every implementation of the system, as per the information obtained from its functioning, the system is modified. This is a continuous process.

We may here list the various steps involved in the development of the instructional system involving a systems approach showing its sequence and cyclic nature:

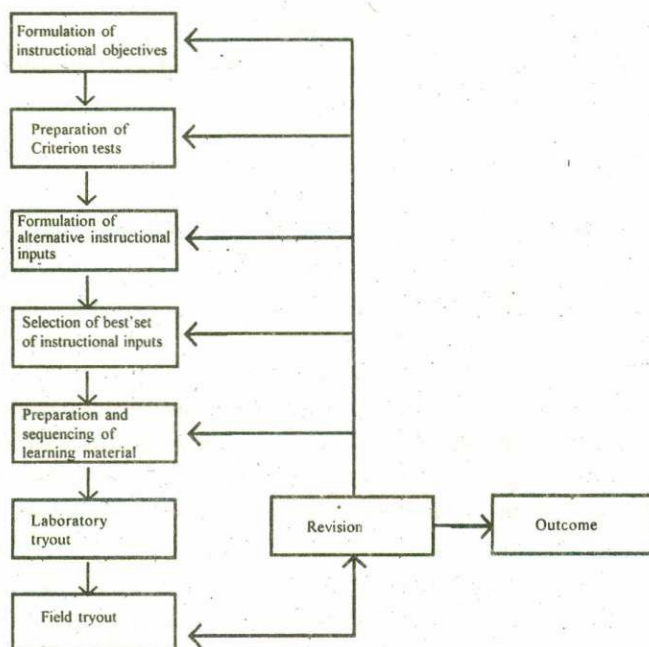


Figure 8 : Steps involved in the development of instructional system

Self-assessment

5. For the subject you are teaching can you apply the systems approach to improve the situation? Give your reasons in about 10 lines.

Yes/No.

Reasons.

Selection of instructional inputs

Various alternative instructional inputs are available from which the teacher has to select the best set of inputs. The selection process is a matching between the characteristics and potential of each and every instructional input alternative and the instructional context. Keeping in view the relevant factors of the instructional context, a few considerations become significant. These may be borne in mind by teacher, while selecting suitable instructional inputs. There are five major selection considerations discussed hereunder:

Instructional objectives

Let us consider one example. There are two passengers beginning their journey from Mumbai. The destination of one is Chennai and the other is Delhi. Hence, naturally they cannot take the same route. The route to reach Chennai from Mumbai would be different from that to Delhi. That is to say, that when destinations are different, the route too would be different. Similarly, if the instructional objectives are different, the instructional inputs to achieve these objectives, are likely to be different too.

Let us suppose that a teacher wants to provide some basic information to the students. For fulfilling this objective, the teacher can very well use the method of lecture. But, can a teacher develop the critical thinking and the skills of experimentation through a lecture? No, he may not be able to do so. The teacher may have to adopt a method where, more of interaction and exchange of views between the learner and the teacher and among learners, is possible for developing critical thinking in them. The method of discussion could, perhaps, be a choice here. And, for developing skills of experimentation, laboratory work may be the most suitable instructional input. One naturally cannot develop the skills of cycling by listening to a lecture on cycling!

Thus, we have arrived at one consideration that has to be borne in mind while selecting suitable instructional inputs. This consideration is the **Instruct objective/objectives** that a teacher wishes to achieve through his teaching.

Learners' characteristics

As a higher education teacher, you may feel that the learners at under-graduation level would benefit, if you provide them with a written material which is self-instructional in nature (like the material you are going through in this course). Yes, you can rightly say that such materials may be of use in providing basic information to students in the undergraduate class. But, if such a written material is being used by a primary class teacher for the learners of standard I, will you consider it to be an appropriate selection? Obviously not. It would be highly improbable that learners at that level would be in a position to engage in the act of reading by themselves for a long time. This is due to lack of maturity with regard to language ability and other mental abilities. There are many other student characteristics too, such as previous knowledge, socio-economic conditions, home background and study habits, which may vary even within a single age group. These characteristics also may have to be considered while selecting instructional inputs. The instructional inputs adopted must take into account the influence all these factors have on the mental and emotional conditions of the learner. For a group like yours which is expected to have independent study habits and self-initiated motivation, instructional inputs such as self-instructional material, library reading and project work may be chosen as the instructional inputs. From the above discussion, it is clear that the **learners' characteristics** are an important consideration for the selection of instructional inputs.

Nature of the discipline

It is true that the various instructional inputs, viz. lecture, self-learning material, discussion, audio-visual presentations, etc., are the methods and media through which the subject matter is presented. The subject matter may differ according to the discipline to which they belong. Every discipline has its own characteristics and structure. For example, for a teacher who wants to teach a topic in Chemistry to the students, a lecture with discussion may not be enough to achieve all the instructional objectives as far as Chemistry is concerned. The teacher may have to demonstrate experiments and organise laboratory sessions where the students get the opportunity to perform practicals where they can experiment with what they have learnt in the class. Similarly, the variations in the structure of discipline also decide what sort of approach is to be followed in the treatment of the subject matter, in the sequencing of experiences, etc. And, therefore, the **nature of the discipline** is an important consideration in the selection of instructional inputs.

Availability or resources

Closed circuit television is very effectively used in classrooms in western countries, and instruction with the help of computers is not new to these countries either. In India too, television has been brought to use in the instructional process to some extent. But, in most Indian classrooms, it is evident that one cannot use too many gadgets or instruments due to their non-availability and the expenses involved. Although employment of modern media like: TV, computers, etc., makes teaching more effective, it is the teacher's resourcefulness which is more important. Other, less sophisticated and easily available, media may have to be used as second alternatives to the more sophisticated ones. And hence, the availability of these infrastructural facilities would form an important consideration. Time is also another resource which has to be kept in mind while making the selection of inputs. The instructional time available is another resource consideration which is very significant. **Availability of resources** such as infrastructural facilities and time, is an important consideration for the teacher while he is selecting the most suitable set of inputs for his instructional situation.

Size of group

The number of students in a class in our universities and colleges may vary from as small as 5 or 10 students in a post-graduate class, to as large as 100 or 150 (or even more!) in an undergraduate class. A teacher may think it necessary to conduct group discussion in a class of 100 students. However, the largeness of the class may not be conducive for a discussion session. Instead, it may be preferable to have a question-answer session or a panel discussion by a few students. He may, also, if possible, divide the large group into smaller groups and organise discussions separately. On the other hand, a group discussion session would be very useful and feasible in a group of 20-30 students. Similarly, a teacher may employ the lecture as a major technique in a large group. However, in a small group of about 5 post-graduate students, it is waste of time well as energy, on the part of the teacher to deliver lecture after lecture. He should Instead, try to make use of self-study in the library as an important instructional input. Thus, it is evident that the size of the learner group is an important consideration for the selection of instructional inputs.

Ability of the teacher

There are large number of instructional input alternatives available for the teacher to utilize in the classroom. Each of these requires or demands certain types of skills to be possessed by the teacher for effective organisation. For example, a lecture to be delivered effectively by a teacher would require a number of skills, viz. introducing, explaining, describing, narrating, etc. Very different sets of skills are required on the part of the teacher to conduct discussions or seminars or to develop good self-learning material. Though may be desirable, it is too much to expect that every teacher be proficient in all required skills relating to all alternative instructional inputs. Some teachers may present lectures very effectively, while others may be less proficient in it. Hence, the **abilities and skills possessed by a teacher** should also be taken into consideration when he selects the instructional inputs for his own teaching.

Self -assessment

6. List the various considerations to be kept in view while selecting instructional inputs for your class:
7. The teacher's ability is one consideration while selecting instructional inputs. Do you think it is a very important criterion? If a teacher lacks the skills to conduct a discussion, can anything be done to overcome this? Give your answer in six lines.

Effectiveness and efficiency

The effectiveness and efficiency are the two indicators of the functioning of any system including instruction. Let us try to understand the meaning of each of these terms in the context of the instructional system.

Effectiveness

Let us recall the process of development of an instructional system discussed, with the help of an input-output model.

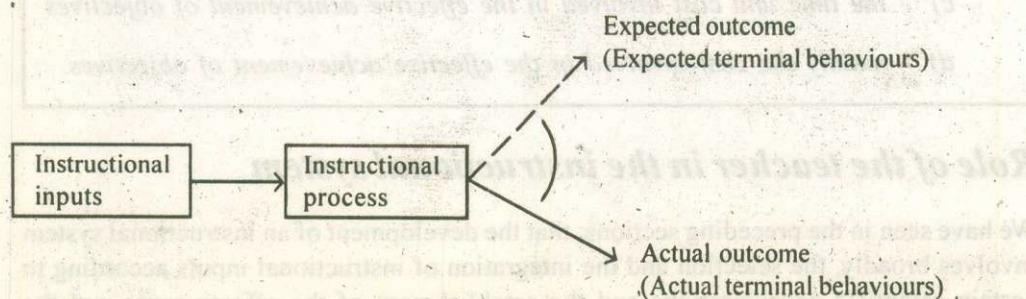


Figure 9 : Input-output model

We saw that instructional inputs are selected and integrated mainly in consideration to the expected learning outcomes. When the system is organised and the criterion tests are administered, we will be in a position to measure the actual learning outcomes. In most of the occasions, the actual learning outcomes do not coincide fully with the expected learning outcomes, thus creating a gap between the two. This gap shows the difference between the learning expected from the students, and the learning that actually takes place. The effectiveness of an instructional system is the extent to which the actual learning outcome (actual terminal behaviour) approximates the expected learning outcomes (expected terminal behaviour). The lower is the gap between the two, the higher the effectiveness of the system. The higher the gap between the two, the lower the effectiveness of the system. The approach of the teacher should be to continually improve the system so that the gap between the expected learning outcome and actual learning outcome is reduced to the minimum or ideally speaking, removed entirely and thus increasing the effectiveness of the system to the maximum.

Efficiency

Efficiency depends on the cost and the time involved in the organisation of an effective instructional system. Let us take an example. If one wants to travel from Delhi to Chennai, one can have three alternatives, viz., travel by train, take a flight or travel by car. All the three are effective ways of reaching one's destination. But, what about their relative efficiencies. Travelling by an aeroplane is very efficient in terms of the time involved in reaching the destination while it may be the least efficient as far as cost is concerned. On the other hand, travelling by train is more efficient in terms of the cost incurred but much less efficient regarding the time taken in reaching the destination. Travelling by car may probably be the relatively least efficient in terms of the time taken for travel as well as in terms of the cost involved when compared to that of train travel.

Similarly, in an instructional situation, efficiency of the system can be seen both in terms of the time and the cost involved. Decision, with regard to which aspect is to be given more consideration, depends on the infrastructural, financial and time conditions.

Self-assessment

8. *Effectiveness of instruction is*

- a) *the extent to which the instructional objectives are achieved.*
- b) *the time involved in achieving the objectives.*
- c) *the cost involved in achieving the objectives.*
- d) *the favourable reaction shown by the students.*

9. *Efficiency of instruction is*

- a) *the instructional objectives achieved.*
- b) *the time and cost involved in its operation*
- c) *the time and cost involved in the effective achievement of objectives*
- d) *mainly the cost involved in the effective achievement of objectives.*

Role of the teacher in the instructional system

We have seen in the preceding sections, that the development of an instructional system involves broadly, the selection and the integration of instructional inputs according to certain scientific considerations and the establishment of the effectiveness and the efficiency of the system through tryout. The teachers' involvement in this context can be

perceived in two different ways and accordingly, he performs two different roles. These roles are discussed below:

Teacher-as an input

The teacher's **role as an input** is a traditional one. We all know that he delivers a lecture or guides the students in a tutorial, or conducts a discussion session. For performing these activities, he manifests the required skills in the classroom situation, and thus becomes part and parcel of the system. In this role, he can be compared to any other instructional input such as the self-instructional print material, audio & video programmes, projectors and the computer-assisted learning. In some cases his role can be replaced by other instructional inputs. A well prepared self-instructional print material can be an effective alternative to the teacher's lecture.

A teacher has to manifest different skills for organising other instructional inputs. The skills associated with delivering a lecture would naturally be different from those for conducting a discussion or demonstrating an experiment, and so on. And hence the teacher is expected to be versatile in performing the role of an input in the instructional context.

Teacher as a systemist

A modern teacher depends on various other instructional inputs for making the instructional process effective. For this, he selects the most suitable instructional inputs from the available alternatives and evolves an instructional system. In this role, the teacher is a decision-maker with regard to the inputs to be used for a particular instructional context and how those are to be sequenced and integrated. Here, the teacher's role can be compared to a conductor of an orchestra. The conductor not only decides the number of the various musical instruments to be incorporated in the orchestra, but also decides the extent and time of involvement of each of the instruments, which together, generate harmonious music. A teacher performs a similar role in the instructional context. We may name this role of the teacher as that of a systemist. While performing this role he goes through a scientific process wherein he makes several decisions with regard to the selection and integration of instructional inputs (including himself as an input) and synthesises an instructional system. In the role of a systemist, the teacher is outside the system boundaries. His role is that of one who creates and improves the system rather than a participant or a sub-system within the instructional system.

Self-assessment

10. Given below, are a few activities of the teacher. Mention against each whether the activity pertains to its function as an input or as a systemist.

- a) conducting a discussion (input/systemist)
- b) deciding what methods are to be adopted for teaching a subject (input/systemist)
- c) obtaining the reaction of students about the teaching (input/systemist)
- d) giving a demonstration in the class (input/systemist).

Summary

The present unit attempted to provide the basic concepts of a teacher's dual role in the whole process of systematisation of instruction. As a systemist, the teacher takes into consideration the potential and characteristics including the organisational details of each and every instructional input alternative available to him. According to the needs of the instructional situation, the teacher selects the most suitable set of inputs and integrates them into an instructional strategy. And as an input, the teacher conducts the selected

inputs manifesting the required skills. The subsequent units of this course present the potential and characteristics of the various instructional input alternatives available for the teacher and also the related skills he has to manifest in organising them in the instructional situation. The present unit hence provides the necessary perspective for the rest of the units in this course.

Unit-end activities

1. Take an instructional situation of your choice. Describe it as a system. Point out possible defects in such a system. And, then explain how in a systematic way, you would find suitable solutions to improve the system. (You may not be able to complete in one sitting. You may have to collect data from more than one them on paper and then discuss these with your friends/tutors, etc.)

Points for discussions

1. Will too much structuring of teaching through the application of systems approach affect the creativity of teachers and learners?
2. Is systems approach an attitude or a way of thinking and action, or is it a set of mechanical steps?
3. After going through this unit, do you have a different perspective on your teaching function?

Suggested readings

Elington, H. Percival, F. and Race, Phil (2003). *Handbook of Educational Technology*. New Delhi : Kogan Page India Private Limited.

Kulkarni, S.S. (1986). *Introduction to Educational Technology*. Bombay: Oxford and IBH Publishing Co.

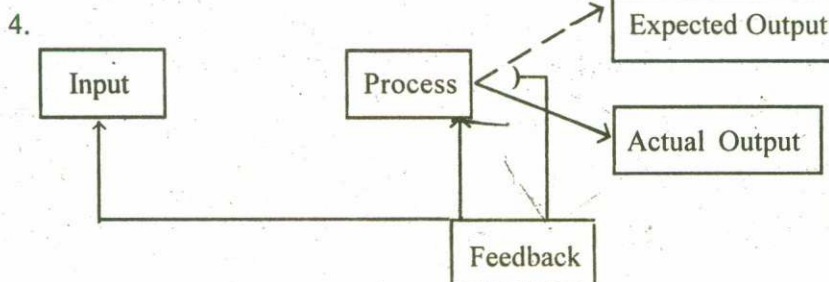
Sharma. Motilal (1985), *Systems Approach, Its Applications in Education*, Bombay: Himalaya Publishing House.

Sampath, K. Pannerselvam, A. Santhanam, S. (1998). *Introduction to Educational Technology*. New Delhi : Sterling Publishers Pvt. Ltd.

Singh, Amrik (1995). *The Craft of Teaching*. (ed.), New Delhi. Konark Publishing House.

Answers to self-assessment

1. i) c ii) d iii) b
2. You may give five components similar to the following:
Lecture, Demonstration, Discussion, Seminar, Practical experiences, Field work, etc.
3. i) ✓ ii) × iii) × iv) ✓ v) ✓ vi) ✓ vii) ✓



5. Yes. Systems approach is a key to solve any problem situation including those in teaching. Through the application of this approach one can modify one or more of the various steps involved in the planning and organisation of the teaching process such as the formulation of objectives, analysis of teaching tasks, selection of the inputs, development of instructional material and organisation of learning experiences. These steps do not differ what ever be the subject being taught.
6. a) Instructional objectives
b) Learners' characteristics
c) Nature of the discipline
d) Availability of resources
e) Size of the group
f) Ability of the teacher.
7. Yes, teacher's ability is an important criterion. If a teacher lacks the skills to conduct a discussion, there are training methods to develop these skills. These skills can be developed to a great extent by practice.
8. a)
9. c)
10. a) input b) systemist c) systemist d) input



ignou
THE PEOPLE'S
UNIVERSITY

Input Alternatives – Teacher Controlled

Introduction

As a teacher of higher education you are allocated certain portion of the syllabus to teach to the students in your classes. Mostly the size of a class in our country varies from 40-120. The portion of syllabus that is allotted to you may be so that you have to teach them on your own or with the help of other teachers and experts. You may avail the infrastructure facilities in your institution to teach the students. Generally the infrastructure facilities that are available in our Indian colleges and universities are classroom, blackboard, media, hardware, laboratory and library etc.

When you start preparing for teaching you must realise that the students are not all prototypes. They belong to various sections of the society, having various interests, aptitudes, and abilities. It is generally seen that a large number of students are of average abilities, a few are not interested in studies, and a few are trouble makers. However, realising the diversity, you expect certain level of output for your teaching. This includes both short term and long term output specifications. Here you play the role of a systemist.

You as a teacher have to plan out your teaching for all the contents/topics given to you for teaching. So, the question before you is how to go about it. You as a teacher must have some ideas as to what are the different strategies that you follow in teaching your subject whereby you feel that you could achieve maximum objectives of teaching.

Make a list of the methods that you have followed and compared it with ones given below.

- i) Explain with illustrations
- ii) Give detailed notes
- iii) Carry out demonstrations wherever possible
- iv) Organise laboratory experiences
- v) Organise field trips
- vi)

A teacher thus follows a number of alternatives in order to achieve various output specifications. These alternatives are called input alternatives, because they act as inputs to achieve some outputs. Input alternatives may be relatively more teacher-controlled or learner-controlled. This means, when the degree of participation of the teacher is more, or when he/determines the exact process including the pace of presenting the messages, their sequence, etc., the alternative is known as teacher-controlled input alternative. Similarly, in the learner-controlled input alternatives, the degree of participation of the learner is more in comparison to the participation of the teacher. This means the pace of learning, the time at which to learn, the sequence of the steps to go through while learning and, to some extent, even “what to learn” -the final output is determined (not necessarily designed) by the learner. The present unit deals with a few teacher-controlled input alternatives. In this connection, we will discuss lecture, demonstration and team teaching.

Learning outcomes

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

- organise your messages/methods of presentation and give an effective lecture;
- plan classroom demonstrations to teach concepts, principles, etc.;
- organise team teaching with your colleagues;

- distinguish/select the method according to the instructional objectives; and
- evaluate the role of lecture, demonstration and team-teaching in the teaching - learning process and combine the lecture method with other methods and media.

What is a lecture?

One of the most common alternatives used by those at the college level is communicating directly to the students where the talking by the teacher is the most predominant activity, and it is called 'lecture'. 'Lecture' can be talking to the students or talking with the students. When it is talking to the students, it takes the form of one way communication in which the teacher plays an active role and remains the main focus. It may take the form of two-way communication when the teacher talks with the students. In this kind, the lecture becomes a question-answer or discussion activity instead of merely giving information.

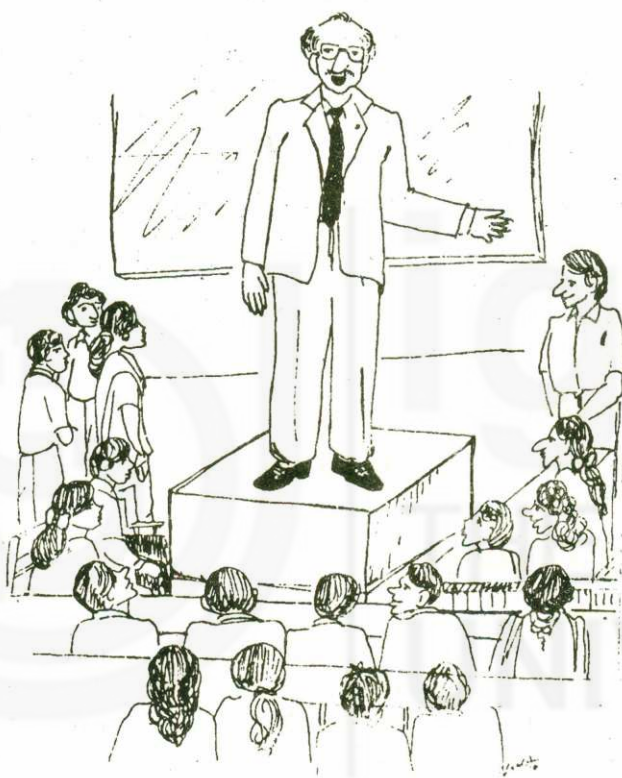


Figure 1 : Is it a lecture?

Lecture, as a method of instruction can be traced back to the time of the *Vedas* and the *Upanishads* in our country, or to the Socratic dialogue in the Greek context. In Vedic period, a lecture was given through question-answer method [with the Shishya (student) sitting by the side of the Guru (teacher)]. In the medieval period, however, a preacher (as in a church or a temple) used lecture as a one way communication, since, in most of these situations, the group of listeners was large.

But with the advent of the printing technology, and of late, of the information and communication technology, the role played by a lecture is being redefined. Unlike the past, when it was equated with mere oratory, it is now seen in a different context. Lecture, once considered to be the sole source of information, is now being treated as only one of the different sources of information available to the learners. Apart from its major function of information-giving, it plays certain unique roles which cannot be performed by other inanimate sources. Firstly, the teacher may use it to motivate the students. It is through listening to lectures, that students are attracted to different areas of study. Secondly, the teacher may use it to integrate various sources of information, and use it as a thread which brings different sources of information into one garland.

Unlike the common belief, the lecture, as a method of instruction, can be used in a structured way. Thus, lecture follows some specific steps through which it is carried out. Let us discuss these in the following sub-section.

Steps in a lecture

Lecture, as a method of instruction, mainly follows two steps, i.e., **Planning** and **Delivery**. The delivery of a lecture is again divided into three phases. These are the introduction, the development and the consolidation phases.

Planning of a lecture

We should dispense with the idea that a lecture does not require planning. An unplanned lecture hardly achieves the objectives of classroom instruction. When we talk of the planning of a lecture, it entails a number of things. The teacher must prepare a lesson plan for the lecture to be delivered. This contains the instructional objectives to be achieved, the amount and nature of content to be covered, the kinds of audio-visual aids that are to be used, class size and nature of students for whom lecture is to be prepared, kinds of questions to be asked, the kinds of other interactional modes to be used, the feedback mechanism to be used, etc. In disciplines which require laboratory work, the teacher must ensure the required logistics inside the classroom such as blackboard, charts, OHP, laboratory equipment to be used, the seat arrangement of the class, and the like. Thus, planning a lecture boosts the confidence of the teacher in handling the class. He/she knows in advance, what to do, when and what not to do. Sometimes, the teacher can plan for humorous interludes, jokes, etc. to make the lecture more interesting. You will know more about this in Block 2, Unit 7.

Delivery of a lecture

As it has already been mentioned, delivery of a lecture is done generally at three phases. Let us now discuss these.

Introduction of a lecture

Sometimes, the introductory phase is also called the warm-up phase. The main task of the teacher here is to establish rapport with the students, create interest and motivation amongst them and gradually lead the learners to the next phase. At this stage the teacher relates the new topic to the one already taught and to the previous experiences. The main function here is to arouse interest and motivate the students. The teacher also uses the blackboard or any other visual medium to highlight the theme. Some of the examples of planning an introduction of a lecture are given hereunder.

A. Plan an introduction to catch the listener's interest

Suggestion Raise a question to be answered by the end of the lecture.

Example: "By the end of the lecture, you should be able to answer the question. 'Are essay test questions better than objective test questions?'"

Suggestion: Explain the relationship of lecture content to laboratory exercises, homework problems, professional career interests, etc.

Example: "Today, I'll lecture on cost-of-living indices, a topic in macroeconomics which will help you understand the recent discussions related to inflation."

Suggestion: Relate lecture content to previous class material.

Example: "For the past few weeks, Skinner, Osgood, and others who take a behaviorist view of language acquisition have occupied our attention. Today, I'll introduce another different perspective on language acquisition and learning. We'll spend the rest of this week and the next on understanding this view and compare with the behaviouristic position."

Alternative: Ask a student to summarize previous course content.

B. Provide a brief general overview of the lecture's content.

Example: "In Victorian England the conflict between religion and science was well reflected in the literature of the time. Today, we'll look at two poems. 'Memoriam' and 'Dover Beach', which illustrate this conflict."

C. Tell students how you expect them to use the lecture material..

Example: "Today I'll offer a specific model of evaluation and illustrate its applicability in several kinds of settings. When you meet in your discussion groups this week, you'll be asked to apply the model."

D. Define or explain unfamiliar terminology..

Example: "In Physics, the term 'work' has a precise technical meaning. The work done by a force, F when the object on which it acts moves a distance q (drawing on the board) is defined by $\text{Work} = \text{Force} \times \text{Displacement}$ or $W = F \cdot q$. It is assumed that F does not change much during the motion through the distance q . Now, let's look at this diagram and see how will you understand the definition of work."

Development phase

This is the most important phase of a lecture, because the transaction of ideas and information between the teacher and the learner takes place here. The teacher explains the concepts and principles, provides facts, data, figures, etc., to the learners. In order to explain the content matter, the teacher cites various examples, uses various communication aids, uses analogies and illustrations, etc. The teacher, when required, adopts different non-verbal communication techniques such as gestures, postures, etc., to facilitate the teaching activity. During this phase, the teacher should be cautious of his lecture otherwise it becomes ineffective.

The following questions relating to Lecture Delivery should be considered throughout the development phase.

For vocal delivery

Do you:

1. Cue important ideas by varying speech rate, volume and pitch?
2. Speak to students and not to the blackboard, walls, notes or floor?
3. Enunciate clearly?
4. Let your sense of humor show?
5. A void repetition of pet words or phrases (e.g., okay, you know, uh)?

Physical delivery

Do you:

1. Establish and maintain eye contact with your students.
2. Use gestures and physical movements which complement your verbal statements (e.g., looking at students while asking for student questions)?
3. Practice in advance with audio-visuals?
4. Avoid using distracting gestures or physical movements (e.g., grooming, pacing)?

Consolidation phase

This is the concluding phase of a lecture. Here the teacher recollects whatever he has covered during the course of lecture. He then summarises the main teaching points of the lecture either verbally, or by writing them on the blackboard or by using OHP. The teacher

also asks a few questions on the content matter covered, in order to evaluate the students' understanding of the lecture. Through these questions, the teacher gets to know the learning difficulties of students and accordingly modifies his teaching. The teacher also gives some take-home assignments to the students which they are expected to complete and bring back for the teacher's remarks. The teacher also informs the students as to what the next lecture will deal with.

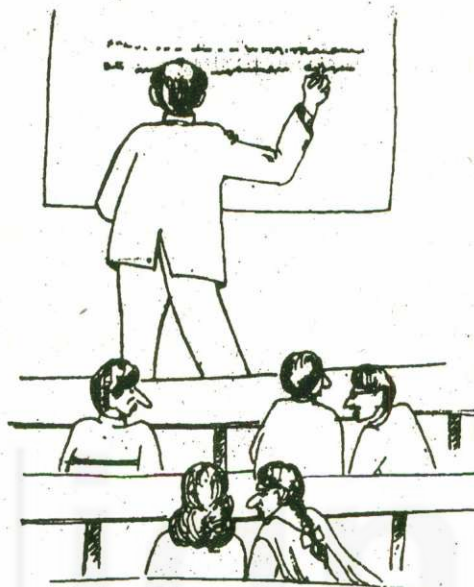


Figure 2 : An ineffective lecture

Self-assessment

1. Given is a list of statements. Put a tick mark (✓) against the statement which is true and cross mark (×) against that which is false.
 - a) Lecture is nothing but oratory.
 - b) Lecture is a method in which both the teacher and the students are active participants.
 - c) There are other sources of information besides the lecture.
 - d) There is no need to prepare a lesson plan for a lecture.
 - e) The teacher should receive feedback from time to time in a lecture session.
 - f) Effectiveness of a lecture depends on the teacher's content competency only.
2. Fill in the blanks with appropriate words:
 - a) The introductory phase of the lecture is otherwise known as thephase.
 - b) The input alternative in which the teacher takes the major role is called
 - c) Planning of a lecture builds up..... in the teacher to face the class.
 - d) The transaction of teaching and learning between the teacher and the students takes place in thephase.

Assessing Lecture

The quality and effectiveness of a lecture may be assessed with the help of a Lecture Appraisal Scale. It is a seven point appraisal scale. You can use this scale to assess the quality of your lecture.

Lecture Appraisal Scale

1. Name of the teacher:
2. Title of the Lecture:
3. Date:
4. Assessed by:

Instructions

Assess the performance by encircling the number which most closely indicates your assessment of teacher's performance on each of the following items:

Description of components		Extremely weak	Very Weak	Weak	Average	Good	Very Good	Excellent
1.	Introduction aroused student's curiosity and interest in the lecture	1	2	3	4	5	6	7
2.	Content was organised effectively	1	2	3	4	5	6	7
3.	Explanations were clear and coherent	1	2	3	4	5	6	7
4.	Examples were simple and meaningful	1	2	3	4	5	6	7
5.	Pace of presentation was appropriate	1	2	3	4	5	6	7
6.	Established good rapport by focusing eyes on students and using other devices	1	2	3	4	5	6	7
7.	Varied the stimuli appropriately to sustain student's attention	1	2	3	4	5	6	7
8.	Modulated the voice effectively	1	2	3	4	5	6	7
9.	Vocabulary used was appropriate and within the comprehension of the students	1	2	3	4	5	6	7
10.	Summed up the theme of the lecture effectively	1	2	3	4	5	6	7
11.	Provided sufficient time to the students to clarify doubts at the end of the lecture	1	2	3	4	5	6	7

(Developed by Dr. M.S. Bawa for Department of Education, University of Delhi.)

Source : School of Education (2003).

Different approaches to content treatment and information processing

Given a content portion a lecturer can treat it in different ways depending upon the teacher's perception of the teaching points. A teacher's perception is guided by factors like his repertoire of experiences or knowledge structure at that point of time, interest in the subject matter, judgement regarding the ability of the students and the amount of time at his disposal.

Some simple ways of content treatments are given below. Reflect on these ways and try to compare one of your lectures with these. Note down the points of similarity and dissimilarity and discuss these with your friends.

i) Serial order presentation

Here the teacher presents the information in a serial order, which is a logical order, with relevant explanations. For example, a Chemistry lecturer in an undergraduate class talks of the occurrence of an element, how it is extracted, its different properties and the uses. Or an English teacher explains a poem line by line, giving the meanings of difficult words, the implied messages, similes, metaphors and the like or a History lecturer, talking about a particular period, giving the dates and events in a serial order and explaining the events.

ii) Reverse order presentation

Here the teacher presents the content in a totally different sequence from the one that is seen in a conventional text book prescribed by the syllabus. For example, a Physics teacher talks about the effect of a particular form of energy deriving it from daily experience and analyses the effect by recalling the effect under varying conditions and leads the analysis to an explanation of the cause or the effect. This is followed by a narration of the discovery of the effect. Yet another example could be an English lecturer talking of various forms of expressing feelings by men of letters and for each form, takes an example from the prose lesson that the students have to learn. A third example could be that of a Geography teacher describing the various effects of climate of a country, thereby trying to derive the parameters that influence climate and then finally disclosing the name of the country and the varying effects of parameters from prior knowledge.

iii) Narration in tune with the nature of the discipline

Three examples are given below. After browsing through, choose the one which is more in link with the discipline that you teach and reflect on the nature of the discipline before you read further.

Example 1: A Physical Science teacher

- a) The spirit of inquiry is the essence of the discipline. For teaching a particular topic through a lecture, the teacher describes a physical phenomenon with the aim of explaining it. The data presented by him are in such a fashion that there arises a problem in the explanation of the phenomenon or a paradox in the explanations.
- b) He proposes evidence and counter-evidence in resolving the paradox. He proposes various hypotheses, eliminates the ones which do not stand the scrutiny of testing or which cannot be logically tested.
- c) He tests the testable ones either logically or by recalling evidences from established texts or prior experiences and arrives at a temporary explanation which might lead to further contradictions.

Example 2: A Language teacher

- a) The beauty in the expression of ideas, feelings, etc., through symbols or letters and the evolution of different styles of expression through time become the essence of

the discipline. Here, the lecturer, like a painter on canvas, slowly describes the contemporary literary scenario, including the socio-cultural context of the period in which a particular author lived.

- b) Then he slowly relates his work with others, thereby completing the picture of the context of the literary creation under study. Similarly the context of the particular piece under study in the total scenario of his other pieces is described. At every possible point of time the particular piece under study is quoted and the relationship established.

Example 3: A History teacher

- a) He has to teach about a particular period of time, the regime, the achievements of the ruler and his contributions. In such a case, the teacher first describes the evidences that are available or those which were available, with a view to tracing back the nature of the regime. More and more evidences to support the nature of the regime are provided at appropriate times.
- b) He then tries to trace the effect that the period has, to the next epoch, and also the reasons for the present from the earlier periods.

The above three are only typical examples of content treatment. In actuality, one lecturer may not strictly follow anyone of these treatment styles alone. He might be using a combination of these and also other forms of content treatment. This suggests that there could be other forms of content treatment. The above ones are only the distinct ways. If the first and the third ones are taken as two extremes, one can visualise a variety of ways as content treatment. This discussion becomes more meaningful in the context of a given content portion.

The suggestion that there could be various ways of treating the content would imply that the same information could be processed in different ways. The teacher supplies and processes the information in the classroom, depending on his perception of the group and the subject matter. Also, the teacher could involve the students in information gathering and processing. This would depend on the interest evinced by the students to gather information, and the time at his disposal and the cooperation extended by the students.

To illustrate the above point:

- a) A chemistry lecturer assigns the students, by giving specific instructions, to collect information regarding the properties of the first 40 elements from books in the library before a particular session on periodic table.
- b) In the class the teacher divides the students into six or seven groups and asks them to draw a graph with the property of elements against the atomic number (each group taking up one property).
- c) Then each group leader is asked to present the nature of the graph to the whole group. (This could be done in different ways depending on the availability of resources, e.g. if media hardware like overhead projectors are available, the groups can be asked to report the graph on acetate sheets).
- d) Lastly, the teacher sums up the class by showing how all the graphs presented show periodicity or else the relationship between the atomic number and the properties of elements is found to be periodic and thus helps the students predicate the properties of elements beyond the atomic number 40.

Another example to illustrate the above mentioned point is, an English teacher intending to develop the skill of precis writing in his students. In this connection:

- a) The teacher assigns different groups in the class to collect newspaper cuttings from specific newspapers on the report of an important international event. Each group is asked to collect five reports each.

- b) In the classroom the members of the groups are asked to read the reports and make a summary of the events specifying the length of the report.
- c) After they have completed the task, the teacher writes the expected points on the chalkboard and asks the students to verify the answers. The teacher also goes round helping students evaluate their reports.
- d) At the end of the class the teacher gives a few tips on scanning, noting down points and on rewriting.

Similarly, you can also think of various ways of treating the content that you teach.

You can also try to gather informal information regarding the liking or disliking of the differential treatments. This would enable you to gain confidence in the various ways of content treatment and to take into consideration the right way of teaching your content. You might change the content treatment the next time when you are teaching a fresh group of students where you find a marked difference in the abilities of individual members of the group.

Above all, the way you would like to treat the content would depend to a great extent, on the list of output specifications that you have set out for your students to achieve. For example, if you want the students to recall definitions, write explanations and give examples, you would naturally adopt the first style presented. But, if you would like your students to reason out a new given situation, using the knowledge that they have, then your style of content treatment would be more or less, like the third style mentioned, i.e., narration in tune with the nature of the discipline.

Lecture in combination with other methods and media

In the examples given in the previous section, you might have noticed that during the presentation, different methods and media hardware are used. For example, the English teacher uses group task as a method. He also uses individual task as a method. The Chemistry lecturer uses overhead projector to present the graphs prepared by the students. This is an example of the use of hardware. Similarly, a variety of methods and media can be used in combination with the lecture method.

To understand this better, you might consider your position as a systemist from a wider angle that is to say, the viewpoint merely from a session or period is insufficient to appreciate this fully. Let us look at content treatment from a larger angle, i.e., the treatment on one unit from the prescribed syllabus for which the time allotted is about ten sessions.

- i) During the first session you introduce the topic to the students through a lecture, at the end of which, a home assignment is given for the students to collect information regarding the topic from identified sources.
- ii) In the next session, a group task is given to the students to process the information collected, which is followed by a discussion.
- iii) During the third session, along with one of your colleagues, you teach the students through 'Team Teaching'. Here, you present two distinct viewpoints on the topic under study.
- iv) During the course of the fourth and the fifth sessions, you engage them in the laboratory/field work, verifying the alternative viewpoints put forward.
- v) In the sixth session, you divide the students into small groups and ask them to discuss their points of view based on their recent experiences and arrive at their conclusions. The teacher acts here as a moderator.
- vi) During the seventh session, you **present a problem** for the students to solve, based on their experiences. A sample of solutions are analysed to study the merits and demerits of the suggested solutions.

- vii) The eighth session is used for **independent study** in the library and the ninth to give a test on the unit. This is immediately followed by a discussion on the expected responses of the test (the feedback).

This is only an illustration to show the combination of methods used along with a lecture, to form a strategy (you will be learning more about the formation of instructional strategies and its potentials in achieving a wide variety of output specifications in the students, in Unit 4 of this block). Depending on the resources available (both human and material) and your creativity, a million different ways of treating the content can be derived to suit different contexts. Your ability to treat the content in different styles is an indication of the 'professional' or the 'systemist' in you.

Versatility of lecture

Versatility of a lecture can be seen in various ways. The lecture provides versatility in terms of the subject matter taught, personality characteristics of the teacher, the teacher-student ratio and the financial implications.

Lecturing can be used to impart knowledge regarding a wide variety of subjects to students. Subjects can range from Mathematics to Languages or Fine Arts, from Theology to Cosmology, or from Trigonometry to Investigative Journalism.

Lecturing is a method that can easily adapt itself to suit a wide range of personality characteristics. A person with oratory skills finds it a high potential alternative with which to convey most of his ideas. A man of a few words, or one who talks in a matter of fact may also find in it, a versatile way of presenting processed information to his students. Given a new setting and a new topic, most teachers resort to this alternative.

This alternative is adaptable to a wide range of teacher student ratio, e.g., in cases where there are only 5 to 6 students in a particular group, the lecturer uses this alternative to give an overview of the topic that they are going to learn in the next few days. Yet another example could be that of a first year undergraduate class in any subject, where there could be a student strength of ,300 or more. In such a situation too, this input alternative comes to your rescue.

In addition to all these, the lecture technique is very economical and can be made very effective with proper planning and execution. If judiciously augmented with other input alternatives, the effects it can have on the teaching-learning process, is remarkable in terms of the wide range of outputs that can be achieved (both short-term and long-term).

The above point shows that there can be lectures, and lectures on the same subject or even the same topic. In other words, if four different lecturers are to give lectures to four similar groups on the same topic, it could evoke varying outputs among these four groups of students. This reveals the versatility of this input alternative.

What we have seen in this unit so far is the versatility of the input alternative - 'lecture', and the various ways of treating the content while delivering the lecture. By far, this input alternative is dominated by the teacher activity and to that extent, the involvement of the students in the learning process is not ensured. This is pointed out as the major lacunae of this input alternative. Also because of the lack of involvement of the students in the learning process, the degree of attainment of output specifications is also under question.

Disadvantages

However, the lecture also

- places students in a passive rather than an active role. Passivity can hinder learning and students' attention may be lost.
- encourages one-way communication; therefore, the lecturer must make a conscious effort to become aware of student problems and student understanding of content.

- requires a considerable amount of unguided student time outside the classroom to achieve understanding and long-term retention of content. In contrast, interactive methods (discussion, problem-solving sessions) allow the instructor to influence students when they are actively working with the material.
- requires the instructor to have or to learn effective writing, speaking and modelling skills.
- places the responsibility of organizing and synthesizing content upon the lecturer.

In order to make a lecture really effective, a teacher has to learn many skills. These will be discussed in Unit 7.

Self-assessment

3. *Given below are some situations wherein the teacher has followed one of the three styles, i.e., serial order presentation, reverse order presentation and narration in tune with the nature of the discipline. Mention the style involved for each of the following situation*
- a) *A Biology teacher raises a problem from certain data, asks the students to hypothesise, collect information and verify them.*
 - b) *A Sociology teacher explains the concept of the family, types of families, functions of a family, etc.*
 - c) *A Sanskrit teacher cites the great works at Adisankaracharya, and compares his works with those of other contemporary authors, and describes the socio-cultural milieu that prevailed at that time.*
 - d) *A Geography teacher starts with the variation in the temperature of a place and the cause of it and then comes to the concept of weather and how weather of a particular region can contribute to the climate of that region.*

Demonstration

Another teacher-controlled instructional technique widely used in higher education institutions is **Demonstration**. As college teachers, you may well be acquainted with the word 'Demonstration'. In colleges, especially, Science teachers use demonstration very often, though teachers of other disciplines take recourse to demonstration when something related to teaching of skills comes. A Science teacher demonstrates the Newtonian laws, a Music teacher demonstrates a classical Hindustani music, an Art teacher demonstrates how to sketch and so on. What then is demonstration? Webster Dictionary defines it as "a public showing emphasizing the salient merits, utility, efficiency, etc., of an article or product". While used in teaching, demonstration means showing how something is to be done or not to be done. It involves the art of depicting the skills associated with an action. Sometimes, ideas, attitudes, processes and other intangibles are also demonstrated consciously. Let us now discuss in detail the various aspects of demonstration.

Major characteristics of demonstration

- i) Both **concrete and abstract matter** can be effectively demonstrated. Generally, we demonstrate concrete matter or processes connected with them. But abstract matters like discussing the theme of a play or novel, the organisation of state or federal governments, can also be demonstrated.
- ii) Demonstration is thought to be the best method for displaying skills in operation. Driving of an automobile, playing the sitar/guitar, dissection of a frog, etc., can easily be demonstrated.

- iii) Apart from the demonstrator and the audience, demonstration is facilitated by audio-visual materials like the chalkboard, a filmstrip, a film, a recording, a diagram, a chart, etc. Now-a-days, even critical surgery like heart operation is demonstrated on television.

Principles of demonstration in teaching

The principles of demonstration are the following:

- i) **Establishing rapport:** The demonstrator should always maintain a friendly relationship with students. He should be simple and a warm human being as far as possible. He should stimulate interest and arouse curiosity amongst the students.
- ii) **Avoiding the COIK Fallacy:** The demonstrator must be able to put himself in the role of the observer. Hence, he requires thoughtful and vigilant effort. If he does not make this effort, the demonstrator is likely to commit the COIK Fallacy which stands for 'Clear Only If Known'. In this case, the demonstrator knows his subject well whereas the students who are observers may be ignorant of that.
- iii) **Watching for key points:** The demonstrator must ensure that the key points in the demonstration are being communicated to the students. Hence, he should lay special emphasis on them, repeat them and highlight them.

In a demonstration, there are mainly three important steps/considerations. These are preparation, performance and evaluation. Let us discuss these steps.

Preparing a classroom demonstration

While making preparation for a classroom demonstration, the demonstrator has to take note of the following points:

- i) **To plan a demonstration that will create interest among the students:**
The demonstrator should prepare himself in such a way that his performance will create interest among the students as well as make them active and responsive.
- ii) **'Plan every step (including materials) carefully:**
The demonstrator should ensure that the requirements of every step in the task of demonstration are ready and kept in order. He has to make every piece of equipment ready beforehand. It is undesirable to interrupt and go for some equipment once the demonstration is already on.
- iii) **Rehearse your demonstration:**
After the procedure has been organised, the demonstrator should rehearse the demonstration in order to test it for clarity, interest, duration and other elements, with a good critic.
- iv) **Outline the steps on the chalkboard:**
In order to make the demonstration understandable, the demonstrator should outline the steps on the chalkboard before the class begins. The teacher may remove the steps one by one when a particular step is completed.
- v) **Make sure that everyone can see and hear:**
The teacher should take note of the fact that everyone present during the demonstration can see and hear the teacher. Hence, he should ensure that proper light and seat arrangement exist in the classroom. He must be audible to all the students present.
- vi) **Prepare written materials:**
It is known that learning through hearing and seeing is reinforced by written materials. The demonstrator, therefore, should prepare hand-outs which may be provided to the students at the end of the demonstration. He has to keep in mind

that written materials should not be handed out at the beginning or in the middle of the demonstration because these may disturb the students.

Performing the classroom demonstration

When the preparation for the demonstration is over, the demonstrator starts the demonstration. The key points here are:

i) **Setting the tone for good communication**

The demonstrator should arouse curiosity, and generate interest among the students and hold their attention as he goes through the stages of demonstration. He should not show his wit or profundity because these may confuse the students. He may allow the students to put questions at this stage, about the purpose of the demonstration.

ii) **Keeping the demonstration simple**

The demonstrator should try to keep the demonstration simple. He should take care of the less capable students and stress much on the main points of the demonstration. He should not try to overload the students with many ideas which he knows.

iii) **Not digressing from the main idea**

Sometimes it may so happen that the teacher may digress from the main point and launch into a detailed discussion on something else, which is not the main focus of the demonstration and which can hence be postponed till a later stage. If you do not follow this principle, you will probably frustrate many of your students and in the process, waste a lot of time. Hence the demonstrator should not go out of track during the demonstration.

iv) **Checking continually that your demonstration is being understood**

The demonstrator should always watch his audience and detect signs of bewilderment, boredom or disagreement. He should not have the impression that everything is clear just because no student looks puzzled or asks a question.

Hence, he should put questions to the students in order to make sure that his ideas are getting across the students.

v) **Not hurrying your demonstration**

Sometimes, the demonstrator proceeds somewhat fast while demonstrating. He should keep in his mind that his students are seeing the demonstration for the first time. He may stop the demonstration for a while and ask questions to the students.

vi) **Not dragging out the demonstration**

Everything in a demonstration class should be kept in its proper place. Sometimes, the demonstrator forgets this and walks around the table to grasp something that should have been placed within his reach. This shows his unskillful presentation which mars the students' interest.

vii) **Facilitating observation by students**

It may be remembered that the demonstration is for the students to observe keenly. Hence, the object or process being demonstrated should be clearly visible to the students. And, the significant parts/aspects in the demonstration should be observed and described by the students, rather than merely the teacher giving all descriptions. This would encourage the students to pay more attention to the demonstration and observe things on their own.

viii) **Summarizing as the demonstration goes on**

A good demonstrator keeps on summarizing as the demonstration progresses. He uses chalkboard, charts, diagrams or some other devices for the summarizing purpose in a lengthy demonstration.

ix) Distributing handouts in the end

At the end of the demonstration, the demonstrator distributes handouts, which serve as the summary of the demonstration. These materials must include a step-by-step outline of what the students have just witnessed, followed by the general conclusions and the key points. It may include questions for immediate discussion or for use at the next class meeting.

Advantages and disadvantages of demonstration**Advantages**

1. Difficult concepts become clear to most of the students.
2. It provides an interesting forum for the teacher and students to interact.
3. Students can see as to how things happen, they manipulate objects, record their observations, cross-check with each other and evaluate themselves.
4. Students can develop the skills required to perform the given task.
5. Social development, sympathy and empathy can be developed among the students.

Disadvantages

1. It is not effective in a big size class.
2. It takes a lot of time for the teacher to plan for it.
3. It requires teachers' competency and skills to handle the equipments and do it step by step.
4. Some of the demonstrations require proper natural environment etc. that it is impossible for the teachers to have the demonstration.
5. Same thing does not happen twice.

Criteria for assessing demonstration

In the above sections the common defects and measures to improve demonstrations have been discussed. A critical examination of these defects provides the criteria for assessing demonstration. Two major criteria for assessing demonstration are:

- Effective presentation; and
- Efficient presentation

Please refer to the Scale for Assessing Demonstration (SAD) given in the box for assessing the effective presentation the items appearing at serial numbers 3, 4, 5, 8, 9, 10, 11, 13, 14, 15 and 16 have been included in the Scale for Assessing Demonstration (SAD). For items appearing at serial numbers 1, 2, 6, 7 and 12 in SAD deal with assessment of efficient presentation.

Scale for Assessing Demonstration (SAD)

1. Name of the teacher:
2. Title of the Lecture:
3. Date:
4. Assessed by:

Instructions

Encircle the number which most closely indicates your assessment of the teacher's performance on each of the following components/items:

Sl. No.	Description of components	Extremely weak	Very Weak	Weak	Average	Good	Very Good	Excellent
1.	The equipment, materials, etc., to be used in demonstration were orderly placed.	1	2	3	4	5	6	7
2.	Seating arrangement made possible for all the students to see demonstration and hear the teacher clearly.	1	2	3	4	5	6	7
3.	Demonstration was well-planned.	1	2	3	4	5	6	7
4.	Objectives of demonstration were clarified before giving demonstration	1	2	3	4	5	6	7
5.	Critical points, where special attention was required, were explained to the students prior to demonstration.	1	2	3	4	5	6	7
6.	Various operations were performed efficiently, without fumbling and confusion.	1	2	3	4	5	6	7
7.	Various operations involved in demonstration were carried out in an orderly sequence.	1	2	3	4	5	6	7
8.	Students' attention was focused on important features/aspects of demonstration through suitable devices.	1	2	3	4	5	6	7
9.	Active participation of the students was sought in terms of setting up equipment, observation of phenomenon, explaining causes, drawing inferences etc., during demonstration	1	2	3	4	5	6	7
10.	Media (live, audio-tapes, slides, films etc.) used during demonstration were appropriate.	1	2	3	4	5	6	7
11.	Strategy used for demonstration was appropriate.	1	2	3	4	5	6	7
12.	Short time intervals during the process of demonstration were used for providing useful information	1	2	3	4	5	6	7
13.	At the end of the demonstration, main features of the demonstration were highlighted.	1	2	3	4	5	6	7
14.	Attainments of the students were evaluated through questions	1	2	3	4	5	6	7
15.	Demonstration was well executed.	1	2	3	4	5	6	7

(Development by Dr. M.S. Bawa for Department of Education, University of Delhi.)

Source : School of Education. (2003)

4. Explain in five lines the instructional values of demonstration?

Team teaching

Like lecture and demonstration, team teaching also provides teacher-controlled instructional experiences to the students. This is an instructional technique used by many teachers to improve teaching-learning process in the classroom. It is an innovation in teaching in which two or more teachers plan, execute and evaluate the learning experiences of a group of students. Warwick (1971) defines it as, "A form of organisation in which individual teachers decide to pool resources, interests and expertise in order to devise and implement a scheme of work suitable to the needs of their students and the facilities of the institution". To be brief, team teaching involves a group of persons, or a team, instead of an individual, in the instructional process. A team' is not just a collection of individuals, but, a unit in itself making effort to improve instruction through the reorganisation of personnel in teaching. In other words, two or more teachers are given responsibilities, to work together for the instruction of a particular group of students attempting a particular course.

Team teaching is a type of instructional organisation involving teaching personnel (includes other academic also, such laboratory incharge, librarian, sport teacher, media person, etc.) and the students in which two or more teachers share the responsibility of providing instruction to students. Thus team teaching combines three elements: (i) a distinct student group (ii) a small faculty group responsible for teaching the student group, and (iii) certain persons who assist the teachers and the students.

Origin and growth of team teaching

Though the origin of team teaching cannot be exactly traced back to any particular point of time, the major development in team teaching occurred during the late 1950s American education. Since then, many researches and attempts have been made to spread team teaching as a technique of teaching. In 1955, Harvard University initiated an internship plan in which five apprentices served simultaneously under an experienced teacher for multiple relationships with adults.

Objectives of team teaching

The team teaching has the following objectives:

- to identify better talents and utilise them for the teaching of a certain course;
- to improve the quality of instruction; two heads are better than one because many rains are better than one.

Characteristics of team teaching

The following are the main characteristics of team teaching:

- It is a flexible instructional organisation. It provides for variety in instructional procedures, assignments, scheduling, grouping, etc.
- It binds the teachers, students and other academic personnel in a working relationship with a view to enhancing effectiveness of teaching.
- A group of teachers shares the responsibility of planning, organising, leading, controlling and evaluating teaching of the same group of students.
- Even though team teaching is group-oriented, it protects the professional autonomy

of the individual teachers in classroom. You are free to use strategy(ies) of teaching on the basis of your judgement. This, however, doesn't prevent you from consulting others and seeking their advice. In other words, team teaching protects the sovereignty of a teacher in classroom.

Styles of team teaching

There are mainly four styles of team teaching. They are:

i) Team teaching in the same class period

In this style, the team members discuss the various aspects of the same topic in the same class period. This may bring about the interrelatedness of knowledge through discussions by different teachers from different subjects. The disadvantage with this style is that it may not be workable in institutions where only one teacher is available for each discipline.

ii) Specialisation based team teaching

In this style, team members with different subject specialisations are responsible for all activities of instruction starting from course formulation to evaluation. The course units can be shared by members of the team, depending upon their interests and abilities. The basic motive behind this technique is to make the best utilisation of the available human resources, in terms of subject specialisation.

iii) Ability based team teaching

Here also, a team is responsible for all the instructional activities. The sharing of units is not done according to subject specialisation, but according to abilities involved in teaching activities. With reference to different instructional inputs, there are different abilities and skills involved in activities like lecturing, conducting seminars, guiding discussions, giving demonstrations, etc., which are required on the part of the teachers. According to the abilities of each member of the team, one may do all the lecturing, and the other conduct discussions, etc. Hence, in this style, the different abilities can be maximally utilized.

iv) Relay style of team teaching

In this approach, a teacher is followed by another teacher after he completes teaching of a unit. In this process, two or three teachers are involved in the teaching of a particular course. Here, the division of work is neither according to subject specialisation nor according to the abilities of the members of the team. This approach may not at first glance, appear to have much instructional value, but the worth of it lies in the fact that it can be easily adopted as a beginning, in institutions where team teaching is not in practice.

You have seen four styles of team teaching discussed in this section. It may be remembered that in all these styles the planning and evaluation aspects are also performed together by the team members.

Instructional values of team teaching

The instructional values of team teaching are the following:

- i) The planning, teaching and evaluative procedures adopted in the instructional process carried out by a team of teachers, are generally superior to those done by a single teacher. Here, the basic assumption is that a group of experts whose minds are focussed on the same problem, will usually arrive at solutions superior to those offered independently by individuals.

- ii) Each member gets the opportunity to observe how others teach, to be observed by other teachers, and sometimes shares the teaching of a class with another teacher. This is expected to result in a quality of teaching which is superior to that found in individual teacher classrooms. It is evident that when the member teachers of a team become intimately involved, their self-evaluation and mutual constructive criticism affect the decisions they make as a team regarding planning, teaching and evaluation. This self-evaluation and mutual constructive criticism would facilitate continuous appraisal of one's own teaching procedures, which in turn, would improve the instructional process.
- iii) As mentioned earlier, when two teachers teach as a team in the same period, adopting a well structured argumentative approach, the students tend to achieve higher cognitive abilities and get motivated to express their own ideas or opinions regarding the topic under discussion. This may be very difficult to achieve if only a single teacher is involved.
- iv) Any instructional system would aim at developing certain affective qualities like tolerance, co-operation, democratic outlook, etc., in the students. The functioning of a team is a live demonstration of how these affective attributes are inculcated by the individual members of the team. The students would see for themselves how these attributes help in the successful functioning of a team. This would facilitate the development of these attributes in the students.
- v) Since a team is involved in the evaluative procedures of group of students, the whole evaluation becomes more objective and scientific
- vi) Team teaching involves thorough analysis of the whole instructional process by a group of teachers. This analytical approach by the team makes the instructional system scientific and technological, and improves the functioning of the system.

Self-assessment

5. *Team teaching means:*
 - a) *Two teachers must be involved in the teaching activity.*
 - b) *One teacher after the other will carry out the teaching activity.*
 - c) *More than one teacher would be involved in planning the procedure of teaching and may participate in the actual teaching activity.*
6. *Given below are some instances of team teaching. Name the style of teaching to which each of them belongs: (See the four styles of team teaching described)*
 - a) *In a team-teaching session in History, where two teachers X and Y are involved, Mr. X prefers to conduct panel discussion, whereas Mr. Y does question-answer activity.*
 - b) *Three teachers in Geography planned the entire procedure for teaching, but carried out teaching one after the other.*
 - c) *In a team teaching in Economics, Ms. A is always given the responsibility of teaching Money Banking.*
 - d) *Four teachers in Physics always prefer to discuss the various aspects of light in the same period.*

Summary

We began this Unit with a discussion of the concept of lecture wherein, the lecture is perceived as both one way and two way communication. Moreover, a lecture is also recognised as an integrator of various sources of information. Lecture, like any other instructional techniques, is structured. It has planning, introduction, development and consolidation phases. Thereafter, our discussion shifted to different approaches to content treatment and information processing wherein we provided you with three major styles of content treatment i.e. 1) Serial order presentation 2) Reverse order presentation and 3) Narration in tune with the nature of discipline. The greatest advantage of lecture method is that it can be combined with other methods and media. Thus, the versatility of lecture becomes evident. We then discussed the modes and advantages of demonstrations and team teaching. In demonstration the teacher plans, all the minute steps logically and scientifically. He shall ensure that all the needed materials and equipments are procured and kept ready in the classroom. It helps the teacher to develop certain skills in the students. Team teaching is essential to make the teaching more fruitful by utilising the available expertise in the institution and locality. It requires joint planning and execution by a group of teachers/experts. In these, as well as the lecture, planning of the lesson is very important. Such a planning involves preparation of materials as well as a discussion of these with colleagues.

Unit-end activities

1. Identify the similarities and differences in the three styles of content treatment. Discuss the various possibilities of content treatment with at least two others who are teaching the same subject.
2. Choose a content from your discipline. Treat the same content according to the style best suited for the content. The styles are:
 - a) Serial order presentation
 - b) Reverse order presentation
 - c) Narration in tune with the nature of the discipline
 - d) Lecture in combination with other methods and media.
3. Suppose, one of your colleagues is giving a demonstration in his class, observe the demonstration and assess whether he/she has fulfilled the requirements of the demonstration.

Points for discussions

1. Under what conditions does a lecturer fail to communicate with his audience?
2. What are the precautions one should take to maintain a friendly team spirit among teachers?
3. Other than the usual science laboratory set up, what other learning situations can lend themselves to the demonstration technique for illustrating a major concept?

Suggested readings

Chauhan, S.S. (1989). *Innovations in Teaching Learning Process*. New Delhi: Vikas Publishing House Pvt. Ltd.

Dale, E. (1954). *Audio Visual Methods in Teaching*. New York: Holt Rinehart and Winston.

Ellington, H. Percival, Fred and Race, Phil (2003). *Handbook of Educational Technology*. New Delhi : Kogan Page India Private Limited

Fry, Healther, Ketteridge, S. and Marshall, S. (2003). *A Handbook for Teaching and Learning in Higher Education*. London : Kogan Page.

Kulkarni, S. S. (1986). *Introduction to Educational Technology*. Bombay: Oxford & IBH Publishing Co.

Lowman, Joseph (1984). *Mastering the Techniques of Teaching*. San Francisco: Jossey-Bass Inc.

Sharma, G.D. and Shakti, R. Ahmed (1986). *Methodologies of Teaching in Colleges*, New Delhi: NIEPA.

Singh, Amrik (1995). *The Craft of Teaching*. (ed.) New Delhi : Konark Publishing House.

Upasani, N.K. (1982). *Effective College Teaching*. (2nd ed.), Pune : Kalpana Mudranalaya.

Vedanayagam, E.G. (1988). *Teaching ,Technology/or College Teachers*, New Delhi: Sterling Publishers Private Ltd.

School of Education (2003). ES-331 : Curriculum and Instruction, Block-2 : Instructional System, IGNOU : New Delhi.

Answers to self-assessment

1. (a) × (b) × (c) ✓ (d) × (e) ✓ (f) ×
2. (a) Warm-up (b) Teacher-controlled (c) confidence (d) development
3. a) Narration in tune with discipline
b) Serial order presentation
c) Narration in tune with discipline
d) Reverse order presentation
4. The demonstration technique is a very effective instructional technique whic supplements to the explanation given by the teacher, regarding variou concepts and principles. It provides con-crete learning experiences to th students, thereby strengthening the existing learning experiences.
5. c)
- 6) a) Adility based team teaching
b) Relay style of team teaching
c) Specialisation based team teaching
d) Team teaching in the same period

Input Alternatives –Learner Controlled

Introduction

In the preceding unit, we discussed a few teacher -controlled input alternatives, namely the lecture, demonstration and team-teaching. Now, in this unit, we will discuss some of the learner-controlled input alternatives. In the previous unit, you know that the input alternatives in which the degree of participation of the teacher or teachers is more, as compared to the learners, are called teacher-controlled input alternatives. In the same way, the input alternatives in which the degree of participation of the learners is more, are known as learner-controlled input alternatives. Learner-controlled input alternatives range from the simple assignment to the most sophisticated computer-assisted instruction. In this unit, we have classified the different learner-controlled input alternatives under two broad heads. These are, Self-Learning Methods and Group-Controlled Learning Experiences. Self-learning methods can be more structured or less-structured. In this unit, we will start with more structured methods and then go onto less structured ones.

Learning outcomes

By the end of this unit, you will be able to:

- recognise and use programmed learning materials for your students;
- organise Personalised System of Instruction in your classes;
- use computer instruction materials for teaching-learning purposes;
- organise different group-controlled learning experiences like discussion sessions, seminar, buzz sessions, panel discussions, etc; and
- organise cooperative learning and group investigation activities.

Input alternatives-learner controlled : the concept

All of you know that any instructional system comprises the teacher and the learner besides the curriculum. It is not appropriate to claim that the teacher alone controls the instructional degree of system. Of course, there are certain instructional procedures in which the participation of the teacher is more in comparison to that of the learner. But there also exist other instructional procedures in which the learner plays a pivotal role in the instructional process as compared to the teacher. Hence, the input alternatives which are controlled by the teacher is called teacher-controlled instruction which we have already discussed in the previous unit. In that unit, we discussed a few teacher- controlled input alternatives, namely, lecture, demonstration and team teaching. Similarly, input alternatives which are more controlled by the learner results in learner-controlled instruction.

In learner controlled input alternatives, the learner takes up the responsibility for his/her learning. It, however, does not mean that you, as a teacher, have no role to play in learner-controlled input alternatives. It is a matter of shifting relatively more of the responsibility of learning to the students. When we say that in learner-controlled input alternatives the students assume the responsibility for his or her learning, we want to draw your attention toward the main attribute of this method. That is the emphasis here

is on learning rather than teaching. Your role becomes more of a manager, a facilitator or a guide. Your help is essential throughout the instructional process. Learner-controlled input alternatives include a number of techniques which range from the simple assignment to the most sophisticated computer-assisted instruction. All learner-controlled input alternatives come under the umbrella of self-learning or individualised instruction. In the next section, we discuss the concept and different forms of self-learning

Self-learning

Self-learning or individualised instruction developed when teaching methods meant for all members of a group failed to meet the varying needs of individual students. All underlying assumption in this method of instruction is that human-beings learn many things through their own efforts. Every individual has a natural desire to learn on his/her own. Another assumption is that every individual is unique; he or she learns according to his or her abilities. Hence, any teaching system based on presentation of information to a group cannot take into account the wide variation in the rates at which individual students learn. As the students entering secondary education vary in their abilities, interests and needs, there is a pressing need for a wide range of instructional alternatives which may cater to their individual differences.

Individualized instruction is the only panacea for such needs. The most common description of self-learning methods is that teaching is directed towards individual students rather than the group of students. However, self-learning is not synonymous with independent learning or learning in isolation from other students. Self-learning may encourage independence from the teacher; this, however, is not usually the main aim. During self-learning, the students do not necessarily work in isolation from their peers. The main characteristics of self-learning are:

- emphasis on learning rather than teaching
- recognition of individual differences
- active student participation
- working at one's own pace/self-pacing, and
- provision of feedback and evaluation.

Self-learning as a method of instruction has certain advantages which make it more suited to the students. They are:

- The students learn more effectively when they learn on their own. Self-learning develops critical thinking in handling of study materials on ones own and enhances communication skills and self-reliance.
- Self-learning prepares the student to face the problems in his/her real life
- Learning on one's own is more enjoyable, exciting and rewarding.
- Self-learning promotes self-discipline in the students.

Forms of self-learning

Having discussed the concepts of learner-controlled instruction and self-learning, we shall now proceed on to the forms of self-learning. Self-learning can be of various forms. There are two main categories of self-instruction method: more structured or less structured. In this unit, we shall discuss both the type of self-learning methods. Under more structured methods, programmed learning, personalised system of instruction (PSI), computer-assisted instruction (CAI) are discussed. Considering the inputs required by a teacher at the secondary/senior secondary school level, project work is presented under less structured methods. First, we take up more structured methods.

Programmed Instruction/Learning

Programmed instruction or programmed learning emerged out of the research conducted by B.F. Skinner on operant conditioning (You will study about operant conditioning in detail in course ES-332). Although Skinner's name is always associated with programmed learning, there were several efforts made earlier by some people in this direction. **The Law of Effect** propounded by E L Thorndike (1874-1949) has direct relevance to programming. According to this law, learning which is associated with satisfaction is likely to be more permanent than learning not accompanied by satisfaction. Satisfaction in the form of reward reinforces the behaviour of the student to take interest in his/her learning. This is an important aspect in programming. In 1926, Sydney L. Pressey devised a teaching machine which required students to press keys to answer multiple-choice questions and the next question was presented only after the correct key had been pressed by the student. The idea behind such a teaching machine was that after being exposed to instruction, the student would go through a test presented by a machine and achieve mastery on all the questions (content) till she/he ceased making mistakes.

The real landmark in the development of programmed learning was the work of B.F. Skinner. After conducting extensive research on rats and pigeons, Skinner developed a theory of learning called operant conditioning. According to this theory, behaviour is learned only when it is immediately reinforced, that is, when it is followed by some pleasurable event such as (nod, praise or attention). Therefore, the task of the programmer is to provide contingencies of reinforcement so that the correct responses to the questions presented are immediately rewarded and the incorrect responses are not. Skinner opposed punishment for wrong responses and recommended that punishment should be kept minimum so that there was no danger of developing a negative attitude towards the learning activity. By applying the principles of operant conditioning in teaching human-beings, Skinner developed an instructional model which is popularly known as programmed instruction. The term 'programmed' is used for arranging learning experiences or events in the most logical and psychological sequence so that the student gets maximum benefit from instruction. Programmed instruction is otherwise known as Programmed learning. Having explained the origin and the concept of programmed instruction, we now present to you the various styles of programmed instruction.

Styles of programmed instruction: There are mainly two styles of programmed instruction-linear and branching. These styles aim at programming of subject matter and are widely used instructional situations all over the world. However, there is yet another style which is used for programming of behaviour. This style is called mathetics. In our discussion, we focus on the first two styles.

Linear style: The linear style of programming developed by B.F. Skinner is otherwise known as Skinnerian style. According to this style, the subject matter is broken into small pieces of information (steps) and is presented in a logical sequence of small steps.

These small steps are called frames. The student is required to go through frames containing a bit or bits of information and respond to the question given at the end of each frame. The feedback in the form of correct answer is provided in the next frame. The frames are so designed and arranged that students' errors are kept to a minimum. In other words, programmed instruction ensures that the students makes/commits minimum errors. An example of linear programming is presented through the following frames.

Example of Linear Programming

-
- Sl. No.35. There are two ways of presenting the frames. In one style, the first frame leads to the second, the second to the third and so. This leads to a sequence that resembles a straight line until the whole information is acquired by the student. See the example in the box wherein six frames are sequenced in a linear fashion.
-

F1→F2→F3→F4→F5→F6→

This type of presentation in which frames appear sequentially one after another in a line is called a frame.

(Go to frame 36)

Correct
answer: linear

36. In the linear frame, after the information has been provided, there is always a question which may be like 'fill in the blanks' or 'one word answer' to be responded by the student. There is always a blank or a question in a frame for the student to respond.

(Go to frame 37) ..

Correct
answer: linear

37. Whether it is a blank or a question, the student has to answer: linear respond to it.

The activity on the part of the student to complete a blank or to answer a question in a linear frame is called a se

(Go to frame 38)

Correct
answer: response

38. As mentioned earlier, this feature of the question and response provides scope for active participation on the part of the students. In the last frame, you participated in the instructional process by writing the word.....

(Go to frame 39)

Source: Menon, M.B. (1984). Evolving a multimedia approach to teaching at post graduate level: Vol. II, Ph.D Thesis (Unpublished), M.S. University, Baroda.

Branching style: The branching style of programming was developed by Norman, A Crowder. His intention was to use the errors to direct the students to an appropriate explanation or remedial sequence. Therefore he gave students some information followed by a multiple-choice question and provided a different response for each apparently correct answer (distracter) chosen. Students proceed through such a programme, following different routes or branch and care is taken to ensure that they understand each point before they proceed to the next. There are many similarities between linear style and branching style. However, branching style is different from the linear style. There are two main differences between the linear style and the branching style of programmed instruction.

- In branching style the student is presented with multiple-choice questions and (s)he is to select the correct response of the given choices. Then he is routed through branch according to his response.
- This style is based on explanation and reasoning. Therefore, it has been more effective with brighter students.

An example of branching style is present through the following frames:

Example of Branching Style

39. Examine the frame you are reading at present. Is it an example of a linear frame according to the descriptions given earlier for such frames?

Yes, it is - go to frame 41

No, it is not a linear frame - go to frame 40

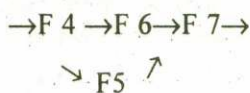
Correct answer: 40 That is right. It is not a linear frame. You had to choose one of the two alternative answers provided to decide your next frame.

Not a linear frame If you had answered. ... You would not have come to this frame.
(Go to frame 42)

41. No, the last frame was not linear because in a linear frame, there is a blank or question to which the student has to respond and he is invariably taken to the next frame in the sequence. Hence the last frame was.

(Go to frame 40)

Correct answer: 42 It was a different type of frame. The pattern was different from a linear frame. In a diagram below, Frame 4 gives two alternatives to the student. It has a provision for branching. See the figure here.



As there is a provision for branching in frame 4, it is known as aFrame.

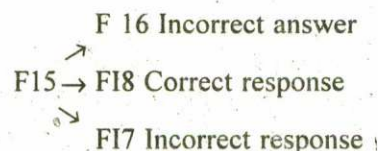
(Go to frame 43)

Correct answer: 43. What about the last frame where we brought in the word branching

Linear- go to frame 44

Branching -go to frame 45

Correct answer: 44 That is right, it was not a branching frame. In a branching linear frame the student is provided two or more possible responses and he 'branches' off according to the response he chooses.



The student goes to two or more different frames according to the choice in the case of a..... frame.

(Go to frame 46)

45. No, it was a linear frame. It has all the characteristics of a linear frame namely, a blank space was provided for the student to respond and all the students were invariably taken to the next frame.

As the above mentioned characteristics were satisfied by the said frame; it was a..... frame.

(Go to frame 44)

Stages for development of programmed learning material; There are three major stages involved in the development of programmed learning material. These are:

- Planning and preparation of the programme.
- Writing of the programme.
- Evaluation of the programme.

Let us discuss each stage in detail so that you acquire the skill of preparing programmed instruction material for your students.

i) **Planning and preparation of the programme:** This stage involves a few specific activities. These are as follows:

- First you have to select the topic which is to be programmed. This selection depends on the style of programming to be adopted, the scope of the use of the programme, the field of specialisation of the programme and so on.
- Second, you have to find out the characteristics of the target population, namely, their age, gender, interests, intellectual level, experiences, cultural background, etc.
- Third, you have to undertake task analysis of the topic selected for programming.
- Fourth, you have to specify the instructional objectives in observable and measurable terms.
- Fifth, you have to write criterion questions for all the objectives which form part of the pre-and post-tests to be administered when the programme is gone through by the student. It provides a basis for evaluating the effectiveness of the programme
- Last, you have to arrange each step/frame/teaching point in a logical sequence. Each teaching point should contain a new information. Also, you have to look into the type of learning involved within each teaching point. This is important as you have to design the instructional strategy accordingly.

ii) **Writing the programme:** The next important task in programme development is writing the programme. Generally, the teachers prefer either linear or branching style. But, sometimes one does find a combination of both the styles in a programme. So the first decision you have to take is whether you want to follow linear style or branching style or a combination of the both. The second task is to take a decision on frame development. There are mainly four types of frames which find place in a programme. These are:

- Introductory frames -The frames are used to introduce information experience.
- Teaching frames -These frames provide new knowledge to the students.
- Practice frames -These frames provide opportunities to the student to practice what he/she has learned from the teaching frames.
- Testing frames -These frames are developed to assess the knowledge gained by the student. The testing feedback will provide information about the level the student has achieved in terms of pre-fixed objectives.

While developing frames you should pay attention to the following principles:

- Prompts or cues, wherever necessary, should be used to help the learners in selection of right answers. The prompts will help the student to commit minimum errors.
- Superfluous or irrelevant material in the programme must be avoided in order to achieve the objectives of the programme.
- Learning material should be presented in a sequence of small learning steps (frames), each step representing a learning point.

- Immediate feedback should be provided after each response to assist the student to know whether or not he/she is progressing properly.
- The objectives should be spelt out at the beginning of the programme. The student should be allowed to proceed at his/her own speed.

While sequencing the material, you may take two approaches into consideration.

- The first is expository or **Rule-eg approach** in which the rule or principle is presented first followed by an example. The second is discovery or **Eg-rule approach** in which an example is given first and it is followed by the rule or principle illustrated by the example.
- Prompt: We have already pointed out that while writing the programmed instruction material, prompts or cues should be used to help the students in the selection of the right answers to the questions. It is, therefore, appropriate for you to know the meaning of a prompt. A prompt is stimulus in a frame which increases the probability of the correct response. Let us understand the concept of prompt with the help of the following examples.
- The device in the frame which increase the probability of correct response is called pr Prompt
- The capital of France is P

Thus, the role of a prompt is to facilitate the probability of a correct response. The incomplete words will help the student to provide the correct answer.

Editing the programme: Once the first draft of the programme is ready, you should ensure that the draft is thoroughly edited by the experts. The editing exercise helps in improving the quality of the programme. The benefits of editing are as follows:

- Elimination of ambiguities and inadequacies in the programme.
- Improvement in the logical sequence of the frames.
- Improvement in the technical accuracy of the programme.
- Examination of the appropriate use of maps, charts and illustrations, etc., in the programme.

iii) **Evaluation of the programme:** When the writing of the programme is over, the next, for you, is evaluation of the programme. Evaluation of the programme is carried out to assess the efficiency and effectiveness of the programme. This evaluation exercise is divided at three stages. There are:

- a) **Individual testing:** At this stage, the testing is done on one-to-one basis. This, may that you, as the programme designer, and one representative of the target group whom the programme is meant are involved in the testing activity. At the outset we should tell the student the purpose of the testing and establish good rapport with him/her. Then you should ask the student to read on the frame and respond loudly, when a particular frame is read by the student, you should ask about difficulties faced by him/her and those difficulties should be discussed with the student. Thus, you will be able to locate the inadequacies in the programme, while doing so, you will be able to eliminate those inadequacies.
- b) **Small group testing:** After making necessary modifications/improvements in the draft programme on the basis of individual testing, the programme is ready to give on a small group of students, say 5-6 students. For this activity you have to give necessary instructions and guidance to the students. At the beginning of the programme, students are administered a pre-test and at the completion of the programme, students are administered a post-test. The data collected from pre- and post-tests are analysed to assess the effectiveness of the programme.

Necessary improvements in the programme should be made on the basis of the results of the testing.

- c) **Field testing:** This is the last stage of testing the programme. At this time the programme is administered on a large group of the target population. Pre-tests and post-tests are administered prior to starting and after the completion of the programme respectively. The data thus collected from testing are analysed and the programme is modified and made ready for use.

Advantages of Programmed Instruction

Programmed instruction has many advantages. Some of them are mentioned below:

- i) It provides individualised instruction.
- ii) It has built in scope for student participation in the form of questions to which the learner is required to respond.
- iii) It has facility for feedback which reinforces the correct answer.
- iv) It develops concepts in small steps.
- v) It can be utilised for any level of learners, viz., primary, secondary and higher.

However, language ability to some extent is expected on the part of the learners. And hence, it is more useful to secondary and higher education levels.

- vi) It can be used for different purposes like remedial learning, diagnostic learning, etc. PLM is an appropriate learning technique for imparting basic information.
- vii) It may be used as an instructional component with other instructional techniques in a multi-media strategy.
- viii) It could also tend to develop higher cognitive abilities if the material is properly programmed.

In the previous discussion, we gave an example of programming verbal behaviour. A question may arise here, "can we not programme psycho-motor behaviour?" Yes, we can. All types of activity-oriented learning can also be programmed. For instance, skills associated with driving a car or working on a machine can be programmed.

Self-assessment

1. Which of the following does not serve the purpose of self-learning method?
 - a) To encourage students to learn on their own.
 - b) To make instructional activity more individualised.
 - c) To discourage teachers from teaching in class.
 - d) To develop in the learner, analytical thinking, self-dependence and self-evaluation
2. Which of the following is absent in programmed learning material?
 - a) Individualised instruction
 - b) Self-feedback
 - c) Classroom teaching
 - d) Students' active participation in learning
 - e) Small steps

3. Name three major stages for development of programmed learning material?
4. Below is a list of statements. Write 'T' against the statement which is true and 'F' against the statement which is false.
 - a) Each frame should contain a teaching point.
 - b) In a branching frame, the learner is provided with two or more possible responses.
 - c) A teaching point may be a fact, or an event, or an idea, or a principle, or even a diagram.
 - d) Linear frames provide subroutes for learners who make wrong responses.
 - e) To fill in the blank in a linear frame is called response by a learner.
 - f) Branching form of programmed learning contains only branching frames.
 - g) Remedial frames are a must in branching programme.
 - h) Psycho-motor activities can also be programmed.

Personalised system of instruction

Personalised System of Instruction (PSI) is another self-learning technique which emphasises individualisation of instruction in higher education. It has been widely used all over the world and is known as Keller Plan. This technique was first developed in 1963 by Fred, S. Keller, who was teaching psychology in the University of Brazilia. It is called as personalised system of instruction, because the instruction is always fashioned according to the need and ability of the student. According to Green (1964) (referred in Chauhan, 1989) personalised system of instruction gets its name from the fact that each student is served as an individual by another person, face to face and one to one, in spite of the fact that the class may number 100 students. It is suitable for courses for which the student is expected to acquire a well-defined body of knowledge or skill-the majority of college course. The PSI teacher expects almost all of his students to learn his material well and is prepared to award high grades to those who accept the responsibility of meeting this goal within the normal units of manpower, space and equipment." The students are given programmed texts to read although they are directed to consult other library books. A student's performance is frequently reinforced. He is allowed to learn at his own pace. He is provided feedback from time to time. A student must demonstrate mastery of a topic through a written examination before going onto the next unit/topic. The role of the teacher in this technique is that of a manager of learning. Let us discuss how this technique is implemented for providing instruction to students.

Description of the technique

In PSI, the students are given carefully prepared assignments which generally include programmed learning material, handouts and material which are available in the library. The materials also include questions and exercises. The students are told about the nature of assignment. They are also instructed as to how to read and what to read. The assignment may be of a different kind like laboratory work, library work etc. At a time the student is expected to work on one unit only. The proctors/tutors (not necessarily professional teachers) ensure that the students are provided with proper reading material, remedial material and necessary help whenever students face any difficulties. When a student thinks that he has completed the material, he comes to the proctor. The proctor conducts a short quiz in

order to evaluate the student's mastery over the material. If he is not satisfied with the performance of the student, he asks the student to re-study the course material. If the score is satisfactory, he directs the student to proceed on to the next unit. Students are not given punishment if they commit error or secure low score/grade in assignment. Since the students in this technique learn at their own rate (self-pacing) in order to meet the individual differences in learning, a multi-media approach is followed where the students are provided apart from written material, tapes, film and computer help.

PSI, as an instructional technique, has been proved to be better technique in comparison to conventional teaching. Research evidences show that PSI facilitates better performances, increases retention and promotes transfer of training. While implementing such instructional techniques in teaching-learning situation, the institution should ensure necessary flexibilities in aspects such as examination schedules, annual promotion, etc.

Computer-assisted instruction

One of the most important contributions of modern technology to the field of individualised instruction is the introduction of computers in the teaching-learning process. Although, its use has not yet been extended on a mass scale to our educational institutions, the future years may see the teaching learning activities increasingly computerised. As teachers, we must know the role of computers in the teaching-learning process. Computer-assisted instruction (CAI) is, in a sense, an extension of programmed learning material and the personalised system of instruction. You will learn the details about computer-assisted instruction in Block 2, Unit 9.

Self-assessment

5. *In the Personalised System of Instruction, state what is not usually used as a method of instruction:*
 - a) *Lecture*
 - b) *Programmed text*
 - c) *Audio-visual modules*
 - d) *Tutor aids*
 - e) *None of the above*
6. *PSI can be utilised only if*
 - a) *There is an individualised setting for learning*
 - b) *Professional teachers are available to work as proctors*
 - c) *Specific objectives and mastery level tests are prepared*
 - d) *Adults and not children are the learners.*
7. *A teacher has no role to play in a self-learning method. Do you agree to this statement? Give arguments in support of your opinion.*

Project Work

Project work as a self-learning method is less structured as compared to PLM, PSI and CAI. In colleges, you may be giving assignments to your students on the topics you have taught. This may be, asking the students to read a passage, or giving them some home tasks. When these assignments are done in a systematic and organised manner, they take the shape of project works. It is these project works through which the students get experiential learning. This provides the learners opportunity to learn at their own pace and time, while they do certain activities more or less independently of the teacher. The dictionary meaning of the word 'Project' is a scheme or a design.

Several authors have defined the concept of 'Project'. But, one of the most comprehensive definitions (Good, 1973) (referred in Vedanayagam, 1988), is "A project is a significant, practical unit of activity having educational value and aimed at one or more definite goals of understanding; involves investigation and solution of problems and frequently the use and manipulation of physical materials, planned and carried to completion by pupils and teachers in a natural real-life' manner."

Let us now try to analyse the above definition and specifically formulate the different characteristics of a project work. It provides real-life experiences to the students. It helps them to plan, to observe and to conceptualise. It entails the involvement of both the teacher and the students. It tends to develop self-learning habits in the learners. The learners are able to tackle certain kinds of problems systematically.

Aims of project work

The aims of project work can broadly be classified into the following categories:

- 1) Knowledge
- 2) Skills
- 3) Personality attributes

1) Knowledge

Working on a project, enables the learner to develop knowledge of his topic and the various techniques used in his area of study. He knows about the methodology used in the discipline. He understands the difficulties in solving problems. These may be difficulties related to time, material, labour, cost, etc.

2) Skills

The project work develops the following skills in the learners. They are:

Skills for independent work

Students develop independent thinking and working habits while working on a project. This method inculcates **initiative** and **resourcefulness**. A student learns to plan his work, analyse factors involved in solving a problem, hunt for sources, collect data, select relevant materials, fabricate experiments, manipulate instruments, make keen observations, analyse results, synthesise findings, make generalisation, present his findings and communicate them properly.

Skills for group work

Very often, project work is done in a group. While working in a group, the learners develop the ability to co-operate with others, coordinate and manage the people. Group projects thus provide an opportunity to develop **fellow-feeling** and **democratic spirit**.

Skills for communication

Project work develops in the learner's communication skills through a variety of activities. It develops oral skills by argument and discussion with colleagues and supervisor.

3) Other personality attributes

Project work, apart from its primary goal, i.e., achieving an end product in the form of a report, also inculcates various personality attributes in the learners. These personality attributes may be higher mental abilities like critical thinking, creative thinking, evaluative ability, analytical thinking etc. and certain affective attributes like interest in the area of study, social sensitivity, etc. The project work, therefore, helps in cognitive and affective development of the learners.

Types of project work

Projects may broadly be of the following types:

- i) Laboratory work
- ii) Field work
- iii) Library work

Library work

Very often, the students are asked to undertake projects which relate to library work. Library work is an individual activity which the students are expected to do in the library. This method has the potential to promote individualised learning experiences. Library work is also known as Library Assignment. In colleges, teachers follow different ways of inducting the students to do library work. Two ways of organising this activity are discussed here:

- (i) **After the introduction of the topic by a teacher:** The teacher after providing the necessary information to the students in the class tells them about relevant books which concern the particular topic he has taught along with the relevant page numbers. They are also asked to go through the catalogues, references, journals, etc., to enrich their knowledge about the topic taught. They are also expected to develop a report on the library work they have done.
- (ii) **Before a teacher's lecture/discussion on the topic:** A different way of conducting the library work is to first ask the students to read different books and journals on the topic to be taught. They are asked to come with small reports on the basis of which the teacher holds discussion with them.

Whichever way a teacher may organise the library work, he should specifically tell them of author's name, publisher's name, the year of publication, etc. Moreover, the students should be told how to use the catalogue and other library equipment.

Library work develops the self-study habit among the students. It familiarises them with the existence of the library as a resource and gives them practice in learning to use books, journals, encyclopedia, dictionaries, manuscripts, research abstracts, etc.

Laboratory Work

The objective of laboratory work is to develop certain skills through activities conducted in controlled conditions. Particularly, in science and science-related subjects, the students are required to undertake open-ended experiments or mini- research projects. In undergraduate classes, the students are expected to carry out very small experiments like

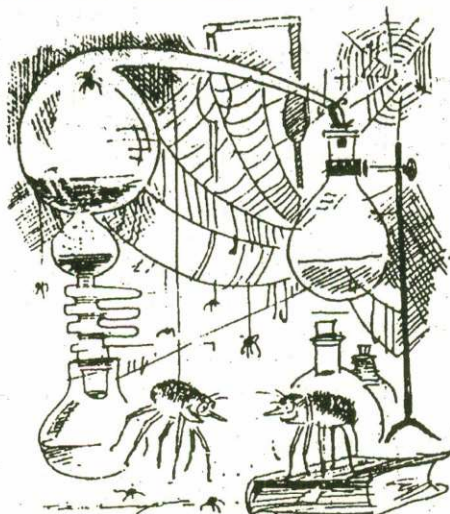


Figure 1 : The nice thing about this research lab is that the scientists are always out attending seminars, leaving you completely undisturbed !

Courtesy : R.K. Laxman

dissecting a frog and displaying its internal parts, finding out the properties of various elements and radicals, taking a thin section of a plant and mounting it on a slide, finding the refractive index of a material using a spectrometer, etc.

Sometimes, the students of a college undertake projects of community interests. Such type of projects include the analysis of the impact of pollution on the environment, analysis of the pesticide content in fruit and vegetables, etc. Thus laboratory work involves the application of the theoretical concepts or principles already learnt, for performing certain activities which may be manipulation, organisation, experimentation, interpretation, etc. Laboratory work develops skills of planning, observation and analysis of the results. The students get real-life experiences (with of course certain controls) and get the opportunity to discover many things themselves whether or not these things have already been discovered by others. Since, the students working on projects have limited subject matter background, their work may not always contribute to discovering new and original ideas. However, if something new and original comes out of the laboratory investigation, it should be considered as a piece of research.

Field Work

Unlike laboratory work, field work is conducted in real-life conditions, but not under controlled conditions. The students are expected to go to the real life situations where they observe a phenomenon, collect the relevant data, process and analyse the data and arrive at conclusion. Hence, it is more in the nature of surveyor data collection in the field. Field work is appropriate both in physical and social science subjects.

Very often, teachers in the college provide the critical description about the various phenomena which can be learnt better by students if they get first-hand experience of these. In such cases, field work is the most appropriate technique that can be utilised. For example, the students of M.A. (Anthropology) class may be given a topic to study the living conditions of a particular tribe. Here, the students are expected to work in that tribal area, observe the living conditions of the tribals, interview and observe them regarding their customs, traditions, beliefs, etc. They also collect and make use of the available literatures. Once the data are collected, these are analysed and conclusions arrived at. Finally, the project report is prepared by the students.

How to Organise Project Work?

Project work is an effective instructional method which requires participation of both the teacher and the students. With your initiative and direction the students can be fruitfully engaged in the project work. Let us discuss what is expected of you as a teacher while organising project work.

Preparation for project work: When preparing for the project work, you should help the student to perform the following tasks:

- Selection of appropriate subjects/skills/procedure/problems/topics for the projects.
- Offering students a choice of subject/skill/procedure/ problem/topic (if feasible).
- Formulating or rather helping to formulate clear objectives of the project.
- Listing the resources and guiding how to locate and use those resources.
- Sequencing the work efficiently.
- Time-tabling the project realistically.
- Organising an adequate record system.
- Organising and explaining the assessment schedule.
- Formulation of evaluation criteria.
- Outlining evaluation procedures

With the preparation of the above tasks, you should be able to set the stage for implementation of the project. At the implementation stage also, you are expected to perform a number of tasks.

Tasks at the implementation stage: The tasks performed by you during the implementation of the project are as follows:

- Organising a preliminary briefing session for the students. Forming groups for group projects.
- Helping every student select a topic/subject for the project.
- Assisting every student to plan the project by checking the plan outline, eliminating weaknesses, correcting work sequences, suggesting optimal use of resources, checking feasibility of the timetable, suggesting appropriate sources of information, etc.

Table 1: Evaluation Scheme for Project Work

Stage of Project	Rating						Marks		Remarks
	E	VG	G	S	FS	U	Total	Awar- ded	
	5	4	3	2	1	0			
Planning									
1. Selection of problem							5		
2. Formulation of objectives							5		
3. Task analysis							5		
4. Strategy/Plan							5		
5. Sequence							5		
6. Methods							5		
							30		
Implementation									
7. Information							5		
8. Project methodology							5		
9. Use of equipment/ material							5		
10. Organisation							5		
11. Application							5		
12. Analysis							5		
13. Synthesis							5		
							35		

Reporting									
14. Interpretation							5		
15. Evaluation							5		
16. Conclusion							5		
17. Project report or product							30		
18. Presentation							5		
							50		
							115		Grand % Total Mark

E = Excellent 5 Marks

VG = Very Good 4 Marks

G = Good 3 Marks

S = Satisfactory 2 Marks

FS = Fairly satisfactory 1 Marks

U = Unsatisfactory 0 Mark

- Checking every student's progress regularly.
- Suggesting modifications to plans when necessary.
- Encouraging and assisting individual student frequently.
- Checking student's evaluation procedures.
- Assessing the project in accordance with the planned scheme.
- Evaluating the whole project with other students including the project report, project product or procedure.
- Organising an effective group debriefing session.
- Evaluating the efficiency and effectiveness of the project as a learning activity.

Evaluation of project work

Evaluation of project work involves both the processes and the product of the project. The product of the project may be some concrete material or the project report. A scheme for evaluation of the project work is presented in Table 1.

Role of a student in Project Work

The student has to play an important role in project work. Though you are there to help him throughout, the main responsibility of carrying out the project work lies with the student. There are three major stages the student has to work through while carrying the project are:

- Planning stage:** At the planning stage, the student has to consider the following tasks:
 - The student should have a clear idea of the objectives and the criteria of the project.

- If there is any ambiguity, he should seek your help.
- He should understand the scope and limitations of the project.
- He should carry out a task analysis of the project in terms of skill(s), problem(s) or procedure(s).
- He should design a suitable plan, strategy or method for dealing with the project.
- He should arrange the tasks in a sequence and fix a target date to complete the project.
- He should discuss with you various aspects of planning.

ii) **Implementation stage:** At the implementation stage, the student should carry out the following tasks:

- Collect all necessary information.
- Decide about suitable methods of enquiry.
- Use resources such as equipment, materials, available expertise, etc., effectively.
- Cooperate with other students in case of group project
- Carry out the processes involved in the project, namely, analysis, synthesis, application, decision making, problem solving, etc.
- Stick to time schedule prescribed for the project.
- Secure help and guidance from the teacher throughout the implementation stage.

iii) **Reporting/presentation stage:** The student is expected to carry out the following tasks at the reporting stage:

- Interpret information and use materials properly. Draw appropriate conclusions.
- Compile an effective project report.
- Present the report, product, procedure, decision or solution effectively.

Self-assessment

8. Which of the following is not an aim of project work?

- a) It helps in experiential learning.
- b) It develops in the learners, the spirit of research.
- c) It fosters creativity in the teachers.
- d) It promotes self-learning in the learners.

9. Which of the following is true regarding both laboratory work and field work?

- a) Both are done in controlled environments.
- b) Both are done in uncontrolled environments.
- c) Both are supervised by the teacher.

10. Below is a list of statements. State which of them are true statements and which, false:

- a) Library work increases the burden of the teacher.
- b) With the introduction of interdisciplinary research, the discipline-based researches would be stopped.
- c) Laboratory work and field work develop scientific attitude in the learners.
- d) Library work fosters study habit among the students.
- e) Project work cannot be conducted in languages and literature subjects.

Group controlled learning experiences

So far, we have discussed learner-controlled input alternatives in the form of self-learning or individualised learning. Now, we shall shift our focus from self-learning to group-controlled techniques under group-controlled learning experiences.

Instructional techniques involving group-controlled learning experiences provide room for the learners' **self-development** and active participation in the teaching-learning process. Group-controlled learning experiences are increasingly used in institutions of higher education to facilitate the development of higher cognitive abilities and affective attributes. Before proceeding to learn about group-controlled learning experiences, we should know the meaning of a group. "A group" in a college classroom comprises members having common academic goals, similar academic background and more or less similar age or within a very narrow age range. Other from these, there could be a considerable variation in the socio-cultural background, psychological characteristics like aptitudes, attitudes and interest, and norms and values developed through years. You will know more about group and group dynamics in Course 3 of PGDHE.

Individualised learning Vs. group controlled learning experiences

Now that we know the meaning of a group and its characteristics, we should understand the necessity of group-controlled learning experiences. In this context, we can discuss individualised learning V s. group-controlled learning experiences. As teachers you know that the sole aim of all instructional activities is to provide learning and to bring about the development of an individual in terms of the preservation of his identity and the attainment of meaningful ways of interaction with his environment. In group-controlled learning experiences, the learner is not only influenced by the stimuli, a part of the environment around him, but he can also in turn, influence them as he too has a role in generating the stimuli. Individualised learning is better suited to acquiring knowledge, development of understanding and development of skills. Whereas group-controlled learning experiences, apart from the development of various **higher cognitive abilities**, do help in the development of **affective attributes**.

Having known in brief about the group-controlled learning experiences it is worthwhile to be acquainted with some of the techniques of providing these group-controlled learning experiences.

Some techniques of providing group-controlled learning experiences

There are a variety of techniques of providing group-controlled learning experiences. Illustrations are given below so that you can adapt it to suit your context. Each of these techniques has its own conditions, organisation and instructional potential.

I) Discussion Session

- i) **Conditions:** The simplest form of group-based learning technique is the discussion session., which can be used in a variety of situations in the higher education context, for example situations like giving feedback on the responses of a class test, clarifying the doubts of students at the end of a lecture, resolving the debatable issues raised during lecture, generating alternative solutions to a classroom problem, and breaking the monotony of “teacher talk”.
- ii) **Organisation:** For effective utilisation of this method, the teacher should give sufficient background information to students or ensure that the students already possess the same. This is a primary requisite for a discussion to take off. A discussion cannot operate in a vacuum of information. The ability of the teacher to initiate a discussion often decides the ability to postpone. He may give his judgement later, on the issue being discussed and the responses of individual students. The teacher’ judgement, through even a non verbal cue can affect the nature and pattern of responses.
- iii) **Instructional potentials:** It can develop higher cognitive abilities effectively apart from reinforcing knowledge. The uniqueness of this alternative lies in its simplicity, but its effectiveness is related to abilities of the moderator or leader.

II) Buzz Session

- i) **Conditions:** Based on the previous knowledge of the students, you may pose a set of complicated problems or complex tasks to the students which need the application of previous knowledge.



Figure 2 : Buzz Session

- ii) **Organisation:** In buzz sessions, you allot a fixed amount of time for the students to discuss a problem or a task in small group (in pairs, threes, etc.). Clear instructions may be given so that discussions are productive. The efficiency of such a session would be enhanced by the teacher moving around and getting a feel of the discussions without interrupting. Giving too much of time or too less of time would be counter productive. Once the small groups finalise the solutions to the problem, the representative of the group reports back to the teacher. The teacher has to compile all the reports and provide his judgement to the students. You can organise this even in a regular class of large strength or you can form groups among the students and ask the groups to take their leisure time to discuss their problem and report back to you. This is called Buzz Session, because groups buzz like bees while discussing the problem.

- iii) **Instructional potential:** The uniqueness of this input alternative is that it is useful in deriving creative and innovative solutions to tasks and problems without much sophistication in the procedure adopted or the hardware used.

III) Tutorial Session

- i) **Conditions:** In situations where students need guidance from the teacher regarding a learning task, such as, project work, utilisation of self-learning material. etc., tutorial sessions may be useful.
- ii) **Organisation:** These sessions may be organised even informally as and when the necessity arises, in addition to the ones formally organised through a schedule. In tutorials, the teacher acts as a guidance worker instead of a lecturer. He solves the problems of either the individual student or the group. The students get an opportunity to discuss their learning problems and to clarify their doubts. There are plenty of other situations where tutorial sessions find use e.g., in giving guidance to a few under achievers or slow learners or problem students, to give special assistance to a small group who are enthusiastic, carrying out co-curricular activities like fabricating model, visiting a place of special interest, staging a drama for the annual festival, planning an expedition, etc.
- iii) **Instructional potential:** The uniqueness of this alternative lies in its usability for a variety of purposes. This input is most suitable in helping the learners solve educational and personal problems. Unlike other alternatives discussed in this unit, this is a highly flexible alternative in terms of its organisation and implementation. The effectivity of using this alternative depends, to a great extent, on the interpersonal relationships of the group members with you, and your ability to cope with the dynamism of the relationships.

IV) Debate Discussion

- i) **Conditions:** This alternative is especially suitable to controversial themes or issues and for developing certain skills like logical arguments, weighing evidence, etc., in students.
- ii) **Organisation:** The participating students could be divided into two groups, one for a proposition, and the other, against it. The remaining students can form the audience and towards the end the audience can involve themselves in a short discussion.
- iii) **Instructional potential:** The uniqueness of this alternative lies in its ability to involve the students to a very high degree, in terms of gathering information, processing it and presenting to the audience, proposing, arguing and counter arguing, especially by noting the points raised by the previous speakers.

V) Seminar

- i) **Condition:** When a topic requires in-depth study by means of library work or experiments or such other data collection studies, a seminar is organised by assigning students the different facts of the topic and asking them to present their paper before an interested group followed by a discussion.
- ii) **Organisation:** Presenting a theme paper at the request of a chairperson and then leading a discussion moderated by the chairperson constitute a seminar. More of its organisation, you will learn, in Unit 8 of Block 2.
- iii) **Instructional potential:** The uniqueness of this alternative lies in its use in the higher education courses like professional courses and post graduate courses, as it demands a high degree of information processing abilities on the part of the presenter and the other participants leading to development of higher cognitive abilities. The above statements should not be taken to mean that this alternative is

not of use in an undergraduate class. Students could be divided into groups and each group could be asked to prepare a paper on a given theme. This could be presented by the group leader to the whole class so that all benefit. Recent developments in the subject areas under study could be presented as seminars by selected students of a graduate class following a discussion.

VI) Symposium

- i) **Condition:** This alternative is suitable for teaching topics or themes having various dimensions.
- ii) **Organisation:** Selected students and different staff members can form teams for the presentations. Each team would present the different dimensions of the same theme, one by one, in a preplanned sequence. It would then be thrown open to the 'floor' or 'house' for discussion. A chairman initiates and regulates the proceedings.
- iii) **Instructional potential:** As mentioned earlier, the uniqueness of this alternative lies in its suitability for teaching multidimensional themes or topics and thus it provides a wider prospective to the learners.

VII) Panel Discussion

- i) **Conditions:** When the themes or topics are of a very complex or controversial nature, panel discussion happens to be a good choice as it brings out the difficult aspects in a constructive manner.
- ii) **Organisation:** The members of a panel could be selected students and teachers. Questions regarding a topic or a series of topics could be collected in advance from among the students and they could be sorted out, depending on the subtopics or dimensions of the main theme. The questions are given to the panel members in advance, depending on their expertise on the sub-themes or subtopics so that they come prepared with answers/evidences, etc. A moderator initiates the discussion by explaining the purpose and scope and raises the questions in a predetermined order to the various members of the panel. Then the members of the panel present their views one after the other. Later on each member may also react to the others' views. The different viewpoints and interactions are synthesized by the moderator. If time permits, further questions are invited, on the spot, by the moderator and these are addressed to the panel members. The moderator summarises the key points and highlights the learning points that have emerged out of the deliberations.
- iii) **Instructional potential:** The uniqueness of this alternative lies in its ability to resolve issues and seek clarifications of controversial and multidimensional topics and themes. This process tends to develop abilities such as critical thinking not only in the panel members but also in the larger group.

VIII) Brainstorming

- i) **Conditions:** This alternative is useful in developing the creative abilities of the students. Problems which demand creative or innovative solutions can be presented by the teacher to the students through brainstorming.
- ii) **Organisation:** In a classroom, the teacher can select a problem oriented topic and ask the students to express themselves freely on various aspects of the topic. The teacher assures the students that their expressions will not be criticised, or commented upon in a negative way. The views/opinions of the participants would not be weighed as relevant or irrelevant but the students are encouraged to come out with their own ideas and opinions, feeling, expression and comments. The teacher takes note of all these expressions. After the session, or preferably on another day, the teacher may evaluate, elaborate and integrate the ideas expressed, in order to encourage further thinking amongst the students along newer dimensions.

- iii) **Instructional potential:** The uniqueness, as hinted earlier, lies in its potential to foster creative thinking. This technique is particularly useful for problem oriented themes.

IX) Simulation through Role Playing

- i) **Condition:** This alternative is of use in developing many skills in students like **decision-making, communication, building inter-personal relationships and other composite skills.**
- ii) **Organisation:** Simulation is an alternative which has many facets, like instruction through mechanical simulators, computer controlled simulators, educational games and role playing. Here we would discuss about simulation through role playing as an input alternative. Life-like situations can be simulated inside a classroom, by assigning different roles to different students and asking them to play these roles after giving them the background of an episode. Unlike a stage drama, there are no fixed dialogues and so creative expressions of the students will be encouraged within the parameters of the role that they play.
- iii) **Instructional potential:** The uniqueness of this technique lies in its ability to develop skills using life-like composite problems without the danger of damages caused by learning errors.

In spite of the known potentialities of group-controlled learning experiences, the reality is that the utilisation of such experiences for instruction has not been to the level expected in higher education. Reasons for this could be several. Main among them are the vast amount of subject matter that is to be dealt with, the belief on the part of teachers that every bit of content should be delivered through him and that he is responsible for it, availability of a very handy instructional technique like the lecture, the increasing number of learners in a classroom and the wide variations that exist among them. All these problems can be tackled suitably by making use of the lecture, library work and the group interactional sessions in the available number of hours of each unit. After one or two precise lectures to the entire group of students, they may be divided for the subsequent hours, into more than one group and directed to library work and group interaction alternatively. To sum up, group-controlled learning experiences have a lot of potentialities for a teacher of higher education.

Self-assessment

11. Which of the following is true in case of group-controlled learning experiences?

- It helps the learners develop communication skills.
- Cognitive and affective development in the learners take place as a result of this.
- It helps in the generation of new knowledge.
- It fosters human relations among the learners.
- None of the above.
- All of the above.

12. List 'A' contains some techniques of group-controlled learning experiences and List 'B' contains the nature of each of these techniques. Match List 'A' selecting suitable options from list 'B'.

'A'

'B'

- | | |
|----------------------|-------------------------------------|
| 1. Debate discussion | A. Simplest form of interactions |
| 2. Buzz session | B. Life-like situations are enacted |

3. Discussion session	C. Two or more teachers teaching as a team to a large group
4. Tutorial session	D. Resolving issues of controversial and multi dimensional nature
5. Brainstorming	E. Discussion in small group, preferably in pairs or a group of threes
6. Role playing	F. Teacher as a guidance worker
7. Symposium	G. Issues are individually reflected upon before reporting to the group
8. Seminar	H. More than one member present their views on the same topic which is followed by discussion
9. Panel discussion	I. When one group gives its views on a chosen top the other group puts forward its views against it.
	J. Mostly used in professional and post- graduate courses
	K. The session in which the teacher welcomes everybody's experiences, to solve the problem without commenting on anyone's point of view.

Co-operative learning method

Dedicated teachers are always looking for better ideas for meeting the many challenges they face in colleges, especially as diversity increases in the student population. Cooperative learning methods provide teachers with effective ways to respond to diverse students by promoting academic achievement and cross-cultural understanding.

How to make co-operative Learning Successful

Cooperative learning takes many forms and definitions, but many cooperative approaches involve small, **heterogeneous** teams, usually of four or five members, working together towards a group task in which each member is **individually accountable** for part of an outcome that cannot be completed unless the members work together, in other words, the group members are **positive interdependent**. A vivid example of interdependence can be found in the relationship between language-minority and language-majority students in two-way immersion programs. For example, the Hindi speaking students work together with a student from other language background to become bilingual. A dull student learn with the help of the other classmates to enhance his/her learning.

Positive interdependence is critical to the success of the cooperative group, because the dynamic of interconnectedness helps students learn to give and take to, realise that in the group, as well as in much of life, each of us can do something, but none of us can do everything. When cooperation is successful, synergy is released, and the whole becomes greater than the sum of its parts. For cooperative groups to be effective, members should engage in team building activities and other tasks that deal explicitly with the development of social skills needed for effective teamwork. Members should also engage in group processing activities in which they discuss the interpersonal skills that influence their effectiveness in working together.

The essence of the cooperative group is the development and maintenance of positive interdependence among team members. A sense of interconnectedness can help students transcend the gender, racial, cultural, linguistic, and other differences they may sense among themselves. Unfortunately, these differences often are at the root of prejudice and other interpersonal stress that students experience in educational institutions.

When students work in cooperative teams in which “all work for one” and “one works for all,” team members receive the emotional and academic support that helps them persevere against the many obstacles they face in colleges. As cooperative norms are established, students are positively linked to others in the class who will help them and depend on them for completing shared tasks. By becoming knowers as well as learners in a supportive atmosphere, students can establish more equal status relationships with their peers,

When the environment becomes more equitable, students are better able to participate based on their actual, rather than perceived knowledge and abilities. Team work, fostered by positive interdependence among the members, helps students learn valuable interpersonal skills that will benefit them socially and vocationally.

Students do not know instinctively how to interact effectively with others. Social skills, like other skills, should be taught and reinforced. Team building activities will help students get to know and trust one another. Other important social skills include accepting and supporting one another and resolving conflicts constructively. Teachers need to model positive interpersonal skills, have students practice the skills, and encourage the students to process how effectively they are performing the skills. Focusing on social skill development will increase student achievement and enhance the students’ employability, interpersonal relationships, and general psychological health.

Organising cooperative learning: For organising cooperative learning, you should ensure that students work in groups and each group member works in a cooperative manner to achieve the common goal. The specific activities you have to organise are as follows:

- a) **Formation of groups:** You should divide the class into small groups. While forming groups, you should keep in mind the heterogeneity among students in respect of sex, intelligence, religion, etc. Each group should consist of a cross-section of the class: boys, girls; above average, average and below average students in terms of intelligence. You should try to form groups by including students from different communities
- b) **Preparation of cooperative learning sheets:** You should prepare these sheets for all the topics to be taught through cooperative learning. These learning sheets consist of objectives, activities to be done by the group members in accordance with the content of the topic and evaluation items based on the objectives.
- c) **Orientation to the students:** As students are used to working individually, they have to be oriented properly to work together. You should inform them about how cooperative learning will be organised. Every learning point should be discussed collectively. A student who does not understand could be explained well by another student. They should work as a team to achieve the set goals. They should be informed that they will not be evaluated individually; rather the entire group performance will be assessed. The group as a whole should ensure that every individual members of the group learns every concept. Average performance of the group will be the index of group learning progress.
- d) **Conducting the cooperative learning session:** You should allot time for cooperative learning sessions and distribute cooperative learning sheets to the groups. All groups should carry out learning activities according to guidelines given in the sheets. These learning sheets should provide flexibility to the students. The students may modify the activities according to the requirement of the group members. They may discuss the problem, ask questions, explain concepts and solve problems according to their convenience. Every member may be evaluated by the group. If a member commits mistakes, he may be helped by others. At this stage you should observe how cooperatively the groups are working. You should give feedback to

each group about whether they are proceeding in the right direction and gaining from the session. Finally, the group should report about what they have done and how they have performed. The performance reported should be the average performance of the group.

- ii) **Advantages of cooperative learning:** In cooperative learning an informal situation is created based on mutual dependence, feeling of being-accepted, liked and supported by fellow students. They have the freedom to exploit their ideas, discuss with their friends and sharpen their thinking and actions, get help and provide support to others. Thus cooperative learning is quite advantageous to students. The main advantages of cooperative learning are as follows:

Students are often able to translate the teacher's language into their own language and enrich their understanding.

Students learn by actually participating in the teaching-learning process. The students have to organise their thoughts to explain ideas to their mates. They engage themselves in cognitive elaboration that greatly enhances their understanding.

Students can provide individual attention to and get assistance from one another. As they can freely seek assistance from fellow students in cooperative learning, their achievement will be much higher.

Self-assessment

13. *State, in 5-6 lines, the meaning of cooperative learning.*
14. *Main activities to be carried out by the teacher to organise cooperative learning are:*
15. *What criteria will you keep in mind while forming the groups?*
16. *What does a cooperative learning sheet consist of?*
17. *What role a teacher will perform in conducting the cooperative learning session?*
18. *State the main advantages of cooperative learning.*

Group investigation

There are certain topics which raise doubts and questions in the minds of the students and for those they do not find answers in the textbooks. To answer such questions requires investigation into the phenomenon. Problems/questions whose answers are not readily available require investigation. Some of the problems are such that no individual student can investigate these by himself. It is, therefore, desirable to carry out group investigation in such a situation. The process in which a group of students selects problems/questions and tries to find out their solutions collectively in a scientific manner is called group investigation.

Organising a group investigation: In order to take up group investigation as an instructional activity at the higher education stage and to make it successful your guidance to students is very much essential. Do you know how a group investigation should be carried out? It is necessary for you, as a teacher, to know what are the different phases through which group investigation proceeds. A class engaged in a group investigation will go through the following phases:

Selection of problem: You may indicate some exemplar problems and guide the groups to select a suitable problem for investigation.

Cooperative planning: The members of the group will plan their work regarding collection of evidence, sources of evidence, and allocation of work among members. They should also estimate the time to be devoted to investigation work. Besides collecting data from various sources, the group should also plan about how data will be analysed and who will do the analysis. They should also decide the way the report on the investigation will be prepared. For each activity, time must be estimated.

Implementation: Work should be started according to the plan. Every member should try his/her best to complete the activities within the stipulated time. Evidence from all the sources and areas should be collected.

Analysis and synthesis: The collected evidence should be analysed and synthesised logically in order to arrive at valid results.

Preparation of report and presentation: A brief report of the work done should be prepared by each group. The report should include information about how the work was done and what findings were arrived at. The report should not be of more than a few pages. It should not be a very technical report but just a write-up which should be presented by the coordinator of each group.

Evaluation: You should evaluate the work of each team on the basis of your observations of the group's way of solving the problem. You should judge whether evidence collected is adequate and valid and solutions arrived at are logical and based on facts. You should provide feedback to the group.

Summary

In this Unit, we have tried to give you an understanding of the role played by learner controlled input alternatives in the teaching-learning process. We started our discussion with self-learning methods, particularly programmed learning. 'While pointing out the genesis and meaning of PLM, we acquainted you on how programmed learning material is prepared, giving some text on the Programmed Learning through the Programmed Learning style itself, we also discussed personalised system of instruction (PSI), popularly known as the Keller Plan, which constitutes another important self-learning method. Then, we shifted our focus from self-learning method to project work which also comes under self-learning method but is less structured when compared to programmed learning and PSI. Under project method, we discussed mainly three important methods. These are laboratory work, field work and library work. We highlighted on how these methods facilitate experiential learning and how they are carried out in colleges and universities. We also mentioned how to improve upon the present practices of project method. Our discussion also centered around group- controlled learning experiences. In this context, we mentioned nine group interaction techniques and their conditions, organisations and instructional potentials. Lastly, we discussed cooperative learning and group investigation.

Unit-end activities

In India some organisations have developed instructional materials of the types described in this unit, e.g. National Institute of Bank Management and Life Insurance Corporation have prepared a series of Programmed Learning texts (for clerical employees of banks and for career agents respectively). Similar the Technical Teachers' Training Institutes in Bhopal, Chandigarh, etc. have employed PSI in their training programmes. Find out from your friends and through library which organisations in your state have prepared programmed instructional materials.

Points for discussion

1. In recent years there is more and more stress on self-learning methods particularly in industry. Why?

2. Since childhood we learn many things from our peer groups, sometimes in a structured/organised and formal manner, and sometimes in a non-formal or informal manner. Reflect on your experiences and relate what you and your friends have gained from interacting with groups.

Suggested readings

Chauhan, S.S. (1979), *Innovations in Teaching Learning Processes*. New Delhi: Vikas Publishing House Pvt. Ltd.

Chauhan, S.S. (1985), *A Textbook of Programmed Instruction*. New Delhi: Sterling Publishers Private Ltd.

Ellington, H. Percival, Fred and Race, Phil (2003), *Handbook of Educational Technology*. New Delhi : Kogan Page India Private Limited.

School of Education (2003), *ES-331 : Curriculum Instruction, Block-2 : Instructional System*. IGNOU : New Delhi

Sampath, K. Panneersewam, A. and Santhanam, S. (1998), *Introduction to Educational Technology*. New Delhi : Sterling Publishers Pvt. Ltd.

Singh, Amrik (1995), *The Craft of Teaching*. (ed.), New Delhi : Konark Publishing House.

Answers to self-assessment

1. C
2. C
3. i) Planning and preparation of the programme
ii) Writing the programme
iii) Evaluating the programme
4. (a) F (b) T (c) T (d) F (e) T (f) F (g) T (h) T
5. A
6. B
7. No. Though self-learning method, the major role is played by the learners, the teacher has to do a lot, like the preparation of self-learning material, monitoring students learning and evaluation of students' performances at the final stage of learning activity.
8. C
9. C
10. (a) False (b) False (c) True (d) True (e) False
11. F
12. 1) E, 2) E, 3) A, 4) F, 5) K, 6) B, 7) D and H, 8) J, 9) D and H.
13. The method of instruction where students are divided into groups and the students of each group learn with the support of each other. They try to achieve the goal as a group. Due to this there is greater participation and involvement of students. This method of instruction is called co-operative learning.

14.
 - a) Formation of groups
 - b) Preparation of learning sheets
 - c) Orientation to the students
 - d) Conducting the session
15. While forming groups, you should keep in mind the heterogeneity among students in respect of sex, intelligence, religion, etc.
16. A cooperative learning sheet consists of objectives, activities to be done by the group members and evaluation items.
17. While conducting a cooperative learning session, the teacher allots the time for the session, orients the students what they are expected to do, distributes the cooperative learning sheets. The teacher observes the group work and provides feedback to each group. Finally, the teacher evaluates the performance of each group.
18.
 - a) Students express themselves in their own language.
 - b) They learn by actually participating in the teaching-learning process.
 - c) Students can provide individual attention to and get assistance from each other.

Evolving Instructional Strategies

Introduction

Learning is an intentional activity. It requires a systematic planning and implementation of learning experiences. In the previous units, you studied about Instructional Systems and Different Teaching Methods for enhancing learning outcomes of the students. In this unit, we shall discuss the instructional strategies and how we can evolve them for effective teaching. We will also discuss the parameters for evolving instructional strategies at higher education.

Learning outcomes

At the end of the unit, you will be able to :

- define instructional strategies in your subject area;
- formulate instructional objectives for the content you are teaching;
- identify the parameters for evolving instructional strategies;
- design the learning experiences on the basis of Dales Cone of Experiences; and
- appreciate the role of evaluation for effective instruction.

What is an instructional strategy?

Teaching and Learning are complementary to each other. For the purpose of promoting learning in students, the learning experiences need to be well structured and presented to the learner in a meaningful way. The synthesis of these sets of activities is called instructional strategies. It is a process, which is explicitly and systematically designed to ensure that the learners accomplish the instructional objectives. The purpose of instruction is to improve performance. By clearly stating the results we want the learners to accomplish. We can identify if they have gained the appropriate skills and knowledge, because objectives are stated before learners begin their instructional process. They provide students, the means to organize their efforts toward accomplishing the desired behaviours. Therefore, instructional strategy refers to the systematic framework of action for accomplishing educational goals/objectives.

A useful objective, successfully communicates an intended instructional result to the reader by successfully communicating the intent. The best statement is the one that excludes the greatest number of possible meanings other than your intent. In other words, it succeeds in communicating your intent. Objectives are not brief descriptions of lesson content or descriptions of activities in which students will participate. Well-written objectives describe what the student will be able to do after learning the lesson.

Before writing an economics lesson, the author must identify the learning outcomes so that the lesson's activities would be directed toward the desired result. If the objectives are not clear, the author may very well end up with other outcomes that are unexpected or undesirable. There are some basics to keep in mind when crafting instructional objectives. The actual format of instructional objectives varies in educational publications; however, good objectives are student-oriented, observable, clear and unambiguous, and descriptive of a learning outcome. An instructional objective describes what change will take place in



the learner -the student. Many instructional objectives begin with the phrase, “the student will be able to.” The focus is on the students.

Criteria for completeness in instructional objectives

The format known to work for stating clear objectives includes four characteristics that help an objective communicate intent. These characteristics answer four questions:

- Who will be doing the behavior?
- What should the learner be able to do?
- Under what conditions do you want the learner to be able to do it?
- How well must it be done?

An easy way to remember these components is to use the acronym: **ABCD**

- **Audience**
The learners
Identify who it is that will be doing the performance (not the instructor)
- **Behavior (Performance)**
What the learner will be able to do
Make sure it is something that can be seen or heard
- **Condition**
State the conditions you will impose when learners are demonstrating their mastery of the objective. What will the learners be allowed to use?
What won't the learners be allowed to use? Under what conditions must the mastery of skill occur?
- **Degree (or criterion)**
A degree/criterion is the standard by which performance is evaluated. The communication power of an objective increases when you tell the learners **HOW WELL** the behavior must be done. Focus on answering the question, “What’s good enough?”

Common degrees include, Speed, Accuracy and Quality.

Therefore while framing the instructional objectives, it is necessary to follow certain criteria for its completeness.

Self- assessment

1. *What do you mean by ‘Instructional Strategy’?*
2. *What components you need to keep in mind when you frame the instructional objectives?*

Objectives can be written for any type of learning. A common way to categorize learning is by the domain in which it occurs. The three domains as propounded by Benjamin Bloom (1956) are:

- **Cognitive:** thought or knowledge: “what the student is able to do” (an observable)
- **Affective:** feelings or choices “how the student chooses to act”
- **Psychomotor:** physical skills “what the student can perform”

The well all rounded and fully functioning person needs development in all three domains.

Bloom's taxonomy of educational objectives: cognitive domain

Instruction should be used purposefully to achieve well-defined goals. It should focus on questions, which will require students to use the thinking skills. Bloom's Taxonomy (Benjamin Bloom (ed.), *Taxonomy of Educational Objectives: Handbook I Cognitive Domain* (New York: David McKay Co., 1956) is a hierarchical system of ordering thinking skills from lower to higher, with the higher levels including all of the cognitive skills from the lower levels.

Below are the major categories in the Cognitive Domain of Bloom's Taxonomy.

Knowledge

It is the simplest cognitive behavior that involves the recall of information. Objectives concerned with terms and facts, knowledge of methods and criteria for handling terms and facts, and knowledge of the abstractions of a field are properly classified in this category. It focuses on the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcomes in the cognitive domain

Understanding

Objectives classified as "understanding" require the ability to reorganize, restate, and interpret the facts, the methods and criteria for handling facts, and the generalizations and abstractions of a field. The learner is expected to understand what the materials in question mean. Without understanding, the learner will not be able to move to the upper cognitive levels in this domain. Understanding has three sub-categories namely, translation, explanation and extrapolation.

Application

It refers to the utilization of knowledge in a new and different situation. Application covers things as rules, methods, concepts, principles, laws, and theories. Learning outcomes in this area requires a higher level of understanding than those under comprehension. Application mainly refers to the utilization of known and comprehended materials in a new and different situation. Such materials can be main ideas, rules, principles, or even theories'.

Analysis

It requires the individual to determine the elements of some problem or theory under consideration, the relationship among the elements, and the relationship of the elements to the whole. This level can be characterized as taking the "whole" of a problem and breaking it down into its various parts to extract meaning from the situation.

Synthesis

It includes behaviors like the development of a plan or a set of abstract relations. This level can be characterized as taking the various parts of a problem and putting them together to derive meaning from the situation. Learning outcomes in this area stress creative behaviours, with major emphasis on the formulation of new patterns or structures.

Evaluation

Evaluation or judging of theory or products according to internal evidence or external criteria are properly classified as evaluation objectives. Measurement at this level requires utilization of the lower level mental skills (knowledge, comprehension). The student is required to decide between right and wrong, good and bad, relevant and irrelevant. These decisions require knowledge and ability to analyze and synthesize data in the forming of

sound, logical judgments. Items of this type are often quite difficult to construct because the necessity of being able to defend one alternative as a better response to an item than all other possible alternatives.

Self-assessment

3. What are the Major Categories of Cognitive Domain in Bloom's Taxonomy

It is also necessary to know the competencies and the corresponding skills demonstrated in the Cognitive Domain of Bloom's Taxonomy of Educational Objectives. The following table highlights the different levels of cognitive domain and associated action verbs. This will help in preparing the instructional objectives.

Table: 1 Competencies and the Corresponding Skills Demonstrated in the Cognitive Domain of Bloom's Taxonomy of Educational Objectives

Competence	Skills Demonstrated
Knowledge	● observation and recall of information ● knowledge of dates, events, places ● knowledge of major ideas ● mastery of subject matter ● <i>Question Cues:</i> list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
Comprehension	● understanding information ● grasp meaning ● translate knowledge into new context ● interpret facts, compare, contrast ● order, group, infer causes ● predict consequences ● <i>Question Cues:</i> summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
Application	● use information ● use methods, concepts, theories in new situations ● solve problems using required skills or knowledge ● <i>Questions Cues:</i> apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover
Analysis	● seeing patterns ● organization of parts ● recognition of hidden meanings ● identification of components ● <i>Question Cues:</i> arrange, divide, compare, select, explain, infer

Synthesis	● use old ideas to create new ones ● generalize from given facts ● relate knowledge from several areas ● predict, draw conclusions ● <i>Question Cues:</i> combine, integrate, modify, rearrange, substitute, plan, create, design, invent, compose, formulate, prepare, generalize, rewrite
Evaluation	● compare and discriminate between ideas ● assess value of theories, presentations ● make choices based on reasoned argument ● verify value of evidence, recognize subjectivity ● <i>Question Cues</i> assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize

Source: Bloom, B., Englehart, M., Furst, E., Hill, W., & Krathwohl, D. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook-I: Cognitive Domain*. New York: Longmans Green.

Affective domain of the taxonomy of educational objectives

The Affective Domain addresses interests, attitudes, opinions, appreciations, values, and emotional sets. If the teaching purpose is to change attitudes/behaviors rather than to transmit/process information, then the instruction should be structured to progress through the levels of the Affective Domain:

Receiving

The student passively attends to particular phenomena or stimuli [classroom activities, textbook, music, etc.] The teacher's concern is that the student's attention is focused. Intended outcomes include the pupil's awareness that a thing exists. Sample objectives: listens attentively, shows sensitivity to social problems. Behavioral terms: asks, chooses, identifies, locates, points to, etc.

Responding

The student actively participates. The pupil not only attends to the stimulus but reacts in some way. Objectives: completes homework, obeys rules, participates in class discussion, shows interest in subject, enjoys helping others, etc. Terms: answers, assists, complies, discusses, helps, performs, practices, presents, reads, reports, writes, etc.

Valuing

The worth a student attaches to a particular object, phenomenon, or behavior. It ranges from acceptance to commitment (e.g., assumes responsibility for the functioning of a group). It includes attitudes and appreciation. Objectives: demonstrates belief in democratic processes, appreciates the role of science in daily life, shows concern for others' welfare, demonstrates a problem-solving approach, etc. Terms: differentiates, explains, initiates, justifies, proposes, shares, etc.

Organization

Bringing together different values, resolving conflicts among them, and starting to build an internally consistent value system—comparing, relating and synthesizing values and

developing a philosophy of life are parts of organization. Objectives: recognizes the need for balance between freedom and responsibility in a democracy, understands the role of systematic planning in solving problems, accepts responsibility for own behavior, etc. Terms: arranges, combines, compares, generalizes, integrates, modifies, organizes, synthesizes, etc.

Characterization by a Value or Value Complex

At this level, the person holds a value system that controls his/her behavior for a sufficiently long time. Behavior is pervasive, consistent and predictable. Objectives are concerned with personal, social, and emotional adjustment, display of self reliance in working independently, cooperation in group activities, maintenance of good health habits, etc.

Self-assessment

4. *What are the major categories of Affective Domain?*

The third dimension of Bloom's Taxonomy is the Psychomotor domain that reflects the motor skills. Let us understand this domain in detail.

Psychomotor domain of the taxonomy of educational objectives

Instructional objectives and derived questions/tasks typically have cognitive/affective elements, but the focus is on motor skill development. The suggested areas for use are speech development, reading readiness, handwriting, and physical education. Other areas include manipulative skills required in business training [e.g., keyboarding], industrial technology, and performance areas in science, art and music.. In the psychomotor domain, performance may take the place of questioning strategies in many cases.

1. Reflex movements. Segmental, inter-segmental, and supra segmental reflexes.
2. Basic-fundamental movements. Loco-motor movements, non- locomotor movements, manipulative movements.
3. Perceptual abilities. Kinesthetic, visual, auditory and tactile discrimination and coordinated abilities.
4. Physical abilities. Endurance, strength, flexibility, and agility.
5. Skilled movements. Simple, compound, and complex adaptive skills.
6. Non-discursive communication. Expressive and interpretive movement.

Specifying the objectives in behavioural terms

In Unit 1, we have seen that the goal of teaching is to produce learning that is some change in the behaviour of the learner. We also studied that there exists the necessity of getting feedback, some evidence, some data, to check if the expected learning has taken place at the end of the process. The evaluation during, or at the end of, a session is required to see whether the students have learnt or in other words whether the teaching process has been designed effectively. For this purpose, our objectives shall have to be specific, i.e., not vague or ambiguous in terms of learners behaviour which is observable and hence, measurable.

Now compare the following statements and decide which of these are specific objectives in term of learners behaviour.

- i) The student will understand principles of electricity.

- ii) The student will be able to describe the role of Shivaji in building the Maratha empire.
- iii) The teacher will explain the concept of latitude and longitude by using a map.
- iv) The student will be able to select an appropriate instrument for measuring moisture in the air.

What is your answer?

Statement (iii) is obviously not a statement of learning outcome and in that sense it is not an instructional objective. It merely describes an activity which a teacher will be engaged in. It describes the teaching method but not the instructional objective.

Statement (i) refers to a learner's behaviour, but what does the word "understand" mean here? A primary school child understands what electricity is in the sense that, he can push a certain button to get light in the room. An older boy may understand it in terms of the shock that he might have received. An undergraduate college student understands it (we hope) in that he can describe the process by which it can be generated, while an engineering student can set up an experiment to demonstrate how electricity can be generated. Thus the word "understand" is vague, since it does not indicate the level of understanding. Hence this objective needs to be tightened up-made more specific by relating it with the activities which a student can display, so that his learning can be observable and measurable.

The terms "know", "understand", "think", "comprehend" are all words in this category, which do not indicate any specific action that can be observed. Hence there is the need to express these mental processes into some action verbs which indicate the exact desired change in behaviour.

Examples

- i) Describes/writes/defines/states the principle in his own words.
- ii) Identifies examples (out of those given) of the principle.
- iii) Provides (new) examples/illustrations of the principle.
- iv) Infers/derives tenable hypothesis based on the principle.
- v) Distinguishes between two examples (positive-negative) or between two hypotheses or between principles by pointing out specific criteria.
- vi) Explains the relationship between two or more given principles.

Add more such statements which you think can be implied by the term "understand" Let us take another example:

The statement, "he will be able to think critically" could be transformed to: He will be able to:

- i) distinguish between facts and opinions.
- ii) distinguish between relevant and irrelevant information.
- iii) identify fallacious reasoning in a given argument/statement.
- iv) identify/detect/point out, the limitations or inadequacies of a given data.
- v) formulate/infer valid conclusions from a given data.
- vi) identify/point out what additional data are required to make certain generalisations.
- vii) formulate a reasonable hypothesis for further probing/experimenting.
- viii) identify assumptions, underlying conclusion/behind an argument.

Of course all the above kinds of objectives are to be stated in the context of the specific topic/content that you have selected to teach in a given time period.

How specific should an instructional objective be ?

The first test is that it should enable you to write/formulate questions for assessing whether that particular objective is reached. This means that it should also indicate the level and the conditions under which the behaviour is to be displayed.

The second test of the sufficiency of the specificity is when another expert teacher of that subject is able to formulate examination questions of the same level of difficulty and complexity which you aim at, in teaching that topic.

In other words, the instructional objective should be specific enough for two experts to derive the same meaning out of it and decide its desirability or otherwise, its measurability.

Now, go back to your table of specifications and write five instructional objectives which are observable and hence measurable.

Before specifying the objectives, determine your target group, i.e., the students whom you expect to achieve these objectives, and the approximate duration.

Difference between instructional objectives, goals of education, terminal behaviours and learning outcomes

So far we have used these words rather loosely and hence interchangeably. But, then is there really difference amongst them? Yes, and henceforth we should try to use them with their specific meanings. (See figure 3 -Output of a system of education).

The term "Goals of Education" refers to the long-term goals. They are, sort of, general or universal, e.g. to develop citizenship, to develop critical thinking, etc. The time duration in which these are to be attained is not strictly specified. As against this, instructional objectives are objectives which a teacher (designer) has placed before himself to be achieved during a specified instructional period. The instructional objectives should not be vague in that they are stated in observable and hence measurable terms, e.g. on the topic of citizenship to be taught to first year university graduate students, the instructional objective could be:

"they will be able to describe the rights of a citizen guaranteed by the Constitution of India

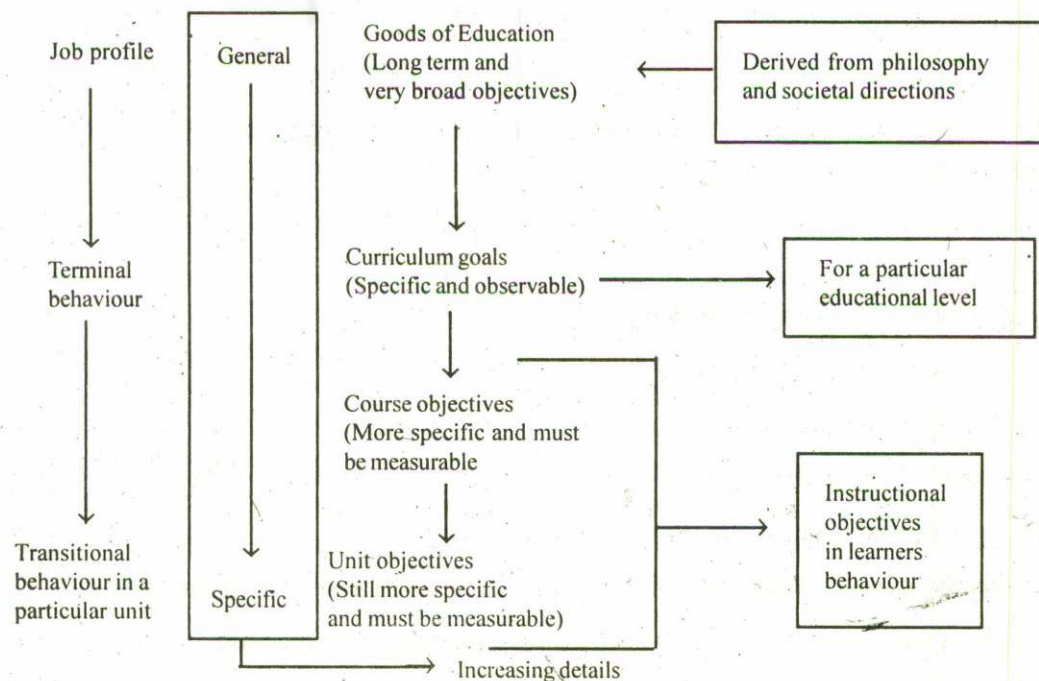


Figure 1 : Output of a System of Education

The statements describing terminal behaviours are to be distinguished from goals of education which are usually vague,

Terminal behaviours are observable and measurable, Often they are derived from the job analysis - or tasks required to complete a particular kind of job, Such a set of statements sometimes include tasks or behaviours which are not specifically taught, as they are presumed to have been mastered by the learner prior to the instruction. On the other hand, there could be some behaviours that will be displayed only after a long practice and which cannot be provided during the instructional period.

For example, the job of a typist might require that he types 60 words per minute and one can attain that speed using a certain method but only after some days' practice. But in the instructional period of, say, a week, the objective could be that he types using all the fingers and without looking at each type set. The speed of so many words would not be an instructional objective, only the competence using a certain method by which, at some later date, he can attain that speed, would be the instructional' objective. Thus, instructional objective would be a part of the bigger whole-terminal behaviours, but may not include all the behaviours/tasks that the student is to perform on the job.

Instructional objectives and learning outcomes

These two terms are synonymous, although there is difference in perspective in the conceptual framework in which they are used.

The term instructional objective, in a sense, presumes that somebody, other than a learner, is planning the instructional process and that this external authority is describing the end result of that process,

The term learning outcome does not necessarily imply such a deliberate systematic "planning of instruction. The learning outcome may or may not be a result of the planned instruction. It may happen due to several other reasons which may or may not be known to the learner and/or to the external authority, namely instructor.

Self-assessment

5. *The difference between instructional objectives and goals of education is that:*
 - a) *Goals are usually too high and hence not practicable.*
 - b) *Instructional objectives are too, narrow and hence not desirable.*
 - c) *Instructional objective are observable and measurable; goals are not.*
 - d) *There is no difference between the two*
6. *Given below is a list of verbs. Choose the ones that can specify the instructional objective in behavioural term',*

a) <i>predict,</i>	b) <i>modify,</i>	c) <i>compile,</i>	d) <i>think</i>
e) <i>synthesise,</i>	f) <i>distinguish,</i>	g) <i>evaluate,</i>	h) <i>compute,</i>
i) <i>understand,</i>	j) <i>analyse</i>	k) <i>explain</i>	

Evolving instructional strategy

For understanding the Instructional Strategy, it is necessary to understand the human information processing strategies. Human mind processes information, generates cognitive structures to be stored in memory, or translated into behaviors such as understanding,

speaking language, and solving problems. The information received by the mind experiences a series of transformations until data can be permanently stored in memory. According to the Atkinson-Shiffrin (1968.) information enters memory first through the five senses or sensory memory and holds the information temporarily where aspects of selective attention, automaticity, and pattern recognition occur. Then it enters short-term or working memory where it can be rehearsed, expanded through chunking, or encoding. At this stage the information is being controlled for a response or transferred into long-term memory where it becomes permanent and is incapable of being lost. Information now takes the form of episodic or semantic memory. Episodic memory focuses on specific events, while semantic memory is associated with the use of language and has the most interest from educators.

Instruction must be designed not to put knowledge in learners' heads but to put learners in positions that allow them to construct well-structured knowledge. The life and career of Jerome Bruner(1960) had significant impact on the cognitive approach to instruction. Bruner believed that the curriculum of a subject should be determined by the most fundamental understanding of the underlying principles that give structure to the subject. This structure included applying disciplinary knowledge. Perhaps the most memorable statement Bruner made was that any subject can be taught in some effectively honest form to any child at any stage of development. His spiral curriculum suggested that one could start with fundamental notions about a subject and expand them to greater details, even to abstract descriptions. This building blocks approach revisits basic ideas over and over again, building upon them until the student fully grasps the complete process.

David Ausubel stressed the importance of cognition in planning instruction and developed certain principles as to how learners increase and reorganize their stored knowledge base. He believed that knowledge could be increased when ideas are established and grouped in cognitive structure. Ausubel then stated that the ideas have direct and specific relevance for subsequent learning tasks; possess enough explanatory power to render otherwise arbitrary factual detail potentially meaningful; provide the stability for newly learned detailed meanings; and organize new ideas or facts around a common theme, combining new knowledge with the existing knowledge already there in the cognitive structure. This instructional design theory involves what Ausubel termed Advanced Organizers.

Self-assessment

7. *What are the contributions of Bruner for evolving Instructional Strategies?*
8. *What are the contributions of David Ausubel for classroom instruction ?*

The process of designing effective and efficient instruction for learners is an ongoing challenge to educators. The ability to implement predictable learning into an organized framework should be the ultimate goal of educators. When designing instruction, it is important to keep in mind how students acquire, process, and use the knowledge they have learned. Cognitive learning strategies view learning as an active process that occurs within the learner. The outcome of learning depends upon how the information is presented and how the learner processes that information.

Another relevant component of effective instructional design involves activating the use of relevant background knowledge, or schema. Jerome Bruner called this the "mental map." The significance of schema to instructional design involves the action to stimulate recollection of previously learned relevant knowledge. A student must be aware of relevant schema and be exposed to strategies that allow him to bridge beyond prerequisite skills to learning objectives. Also important here is the idea of conceptual neighborhoods.

Now we have understood the different perspectives of human information processing models. All these help in evolving an instructional design. There are different steps involved in developing instructional strategies.

Let us understand each one of them in detail

Analysis

A thorough analysis of the learner needs and interests is important. This would help in formulating the learner goals. It includes learner needs and interest, the concerns of society, and the present and future learner needs. The formation of goals must also be appropriately communicated. Anything that is respectably worth learning can be taught in a conceivable form.

Design

Design is concerned with subject matter analysis, lesson planning, and media selection. A course of instruction may focus on skills from three different objective domains, Cognitive, Psychomotor, and Affective. We have discussed these domains in the previous section. Bloom's taxonomy orders the Cognitive domain from the most simple, *Knowledge*, through *Comprehension*, *Application*, *Analysis*, *Synthesis* to the most complex, *Evaluation*. The Psychomotor domain is concerned with gross and fine-motor skills looking at behaviors that can be determined through task analysis. The Affective domain deals with attitudinal behavior from simple awareness and acceptance to internalization as attitudes become internalized. Lesson planning requires that you determine your:

- *Objectives* defined in terms of specific measurable objectives or learning outcomes.
- *Skills, knowledge and attitudes* to be developed.
- *Resources and strategies* to be utilized.
- *Structuring, sequencing, presentation, and reinforcement* of the content.
- *Assessment* methods matched to the learning objectives to ensure agreement between intended outcomes and assessment measurements.

Development

Development is a process of creation and testing of learning experiences and seeks to answer questions such as:

- Have the learning needs and characteristics of the participants been accurately analyzed?
- Were the problem statement, the instructional goals and the instructional objectives appropriate for the learning needs of the participants?
- To what extent are the teaching resources, instructional strategies and the participants' learning experiences successful in effectively meeting the instructional goals and objectives of the target audience?
- Is it possible to accurately assess participant learning with the proposed course of instruction?

Implementation

Implementation is the presentation of the learning experiences to the participants utilizing the appropriate media. Learning, skills or understanding, are "demonstrated" to the participants, who practise initially in a "safe" setting and then in the targeted workspace. It may involve showing participants how to make the best use of interactive learning materials, presenting classroom instruction, or coordinating and managing a distance-learning programme. The progress of the learning frequently follows cyclic patterns based on motivation and intention. Curriculum should be organized in a spiral manner such that the participant continually builds upon what they have already learned.

Evaluation

Evaluation is of two levels. The most important is to gauge the success of the participant obtaining and retaining the demonstrated skills and understandings. The second is to determine how successful the instructional design package was in facilitating effective participant learning. The final question becomes, How can I modify the package to improve its next presentation? Evaluation provides a framework for reorganization of the learning experiences and thus refines the process.

Self-assessment

9. *What are the different steps involved in the evolution of an instructional strategy?*

Deciding time duration

In the above process of developing instructional strategy, it is necessary to decide time duration for each and every learning experience. This component depends on many other factors such as;

- The nature of the content,
- Level of the learner,
- Method of Teaching as per the pre-defined objectives,
- Type of the Learning Experience.

Now here you will get into a problem. Some objectives take a long time-may be years to learn, while some others can be learnt in a few minutes. For example: If you want to teach a student (or from another perspective-if a student is to learn) how some Englishmen first came to India as traders, and then how the East India Company was formed and how they later started conquering and ruling different parts of India; you will require, say, about an hour or two to describe the process. But if you want to get your students to “see” the implications of this trading strategy on the spread of colonialism and also link it with the rise of the Industrial Era in Europe, it will take more than a few hours-probably a week or more. Similarly, if you want to give opportunities to your learners to learn to “think”, “sort out evidences” and “identify gaps in argument”, etc., and for which you decide to use the “project method”, it may not be possible to “finish” the topic even within a few hours. -

Selection of the appropriate method(s) and media

In Units 2 and 3 of this Block, you have studied some methods and you are also going to study more of them in the next Block. Anyone or more (in combination) of these methods can be used to help learners achieve the instructional objectives.

Remember, what we said about a strategy is also true about each of these methods. No teaching method is singularly good or bad. It can be effective or ineffective with respect to a particular goal. For example, a lecture giving information about the formation of East India Company may be good, if the goal is to pass on certain information, and certain data about the Company to the students. But listening to the lecture does not give an opportunity to the learners to derive the implication of such historical events. Even when a lecturer explains such implications and they are heard and later reproduced by the students, the listening, and then the reproducing of certain data, does not provide an exercise to the thinking-in this case, the inferring process of the learners. In other words, a lecture could be effective in relation to receiving some information by the learners, but it may not be effective in terms of making them think. The lecture gets less and less effective if it

presents discrete facts, unrelated data rather than the meaningful information which enable learners to build relations, ("see a pattern" "develop a conceptual map" etc.) (for conceptual map see Unit 7 of Block 2).

Similarly, appropriate media are also to be selected. Another important distinction to be remembered, is between a Method and a Medium. A medium is a vehicle for a message. One may present a message (or series of messages) through a teacher's throat (which is what we call lecture), or through a tape recorder, or through a visual chart, a film, etc. The term "Method" on the other hand, includes the medium, but it is more than a medium in that it also refers to the way the message is organised and sequenced, the manner in which the different bits of messages are integrated, the manner in which the different media are used and related to increase the possibility of the messages being received and comprehended by the listener.

For example, in a group discussion as a method, more than one medium-teacher and participant are used. As distinguished from a lecture (devoid of question answer component), in a group discussion, the sequence of messages is not entirely controlled by a teacher (although to a certain extent a teacher/leader of the group discussion can control the flow of the discussion).

Time duration is also determined by the actual teaching hours as per the norms of the institution. This is an external factor, which also need to be taken into consideration.

In units 2 and 3 of this block, you have studied some methods and you are also going to study more of them in the next block also. Some times multiple methods can be used to help learners achieve instructional objectives. At this juncture, we must discuss about the different learning experiences that promote meaningful learning in students.

For using these methods along with the proper media, you will require certain skills and of course practice. In Block 2, we shall discuss more about these skills.

Self-assessment

10. Rate the following factors as Very Important (A), Important (B) and Not Important (C) while selecting a teaching method. Put a circle around your choice For example if 'A' is your choice, encircle it like this : (A)

- | | | | |
|---|---|---|---|
| 1) Previous experience of students | A | B | C |
| 2) Media available to (or that which can be projected by) a teacher | A | B | C |
| 3) Stage of cognitive growth of the students | A | B | C |
| 4) Method used by the teacher when the latter was in the school/college | A | B | C |
| 5) Method recommended by an old teacher | A | B | C |
| 6) Method recommended by a foreign textbook | A | B | C |
| 7) Logic of the subject matter to be taught | A | B | C |
| 8) Motivation to study independently or in a group | A | B | C |
| 9) Frequency of the feedback required for diagnosis and remedial training | A | B | C |
| 10) Method which the teacher used with his previous classes in the past | A | B | C |
| 11) Media relevant to the necessary learning experiences | A | B | C |

Determining the learning experience

Selecting learning activities for your students is another major consideration when planning a course. Learning by nature is an active process; students learn better when they are involved with their learning and they learn in different ways. Therefore learning activities must;

- Allow students to see the relevance and importance of the course material.
- Give students the chance to use, demonstrate, or question the content.
- Choose activities that match the desired performance, e.g., if the desired outcome is problem solving, use case studies or role playing..
- Help students understand what your expectations are by giving them feedback.

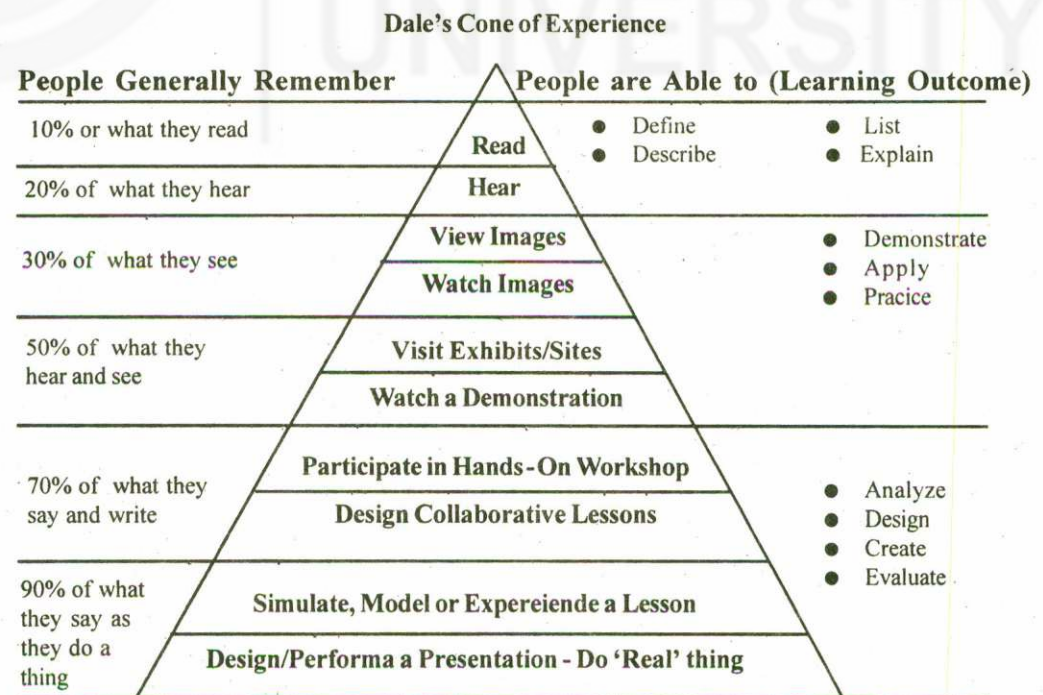
One must consider the following when planning the learning experiences:

- What role will the activity play in the learning process (motivation, elaboration, practice, transfer of learning, problem solving)?
- How does the role affect the complexity and length of the activity?
- Does it have to happen face-to-face, or can it be done on-line? .Will the students enjoy it? .
- Start small. Most students don't want a steady diet of group work
- Know your teaching strengths. Use activities that fit with your teaching style.

Edgar Dale had presented a schematic representation of the different learning experiences that can be provided to the learners for definite learning outcomes.

Dale's cone of experience

Edgar Dale, a famous media specialist and communication theorist formulated a "Cone of Experience" (see figure 1). According to Dale, learning is more effective, if the learner is exposed to the concepts, not only through verbal symbols but also through some experiences relevant to the objectives.



Adapted from Wiman & Memhenry Education Media 1960 on Edgar Dale. (Computer Statistics LLC@ 1999.2002 all rights.)

Figure 3 : Edgar Dale's Cone of Experience

In the figure Lower levels of the cone involve the student as a participant and encourage active learning. Lower levels include more stimuli and are richer with regard to natural feedback -the consequences of an action. Higher levels compress information and provide more data faster for those able to process it. Pictures are remembered (recalled) better than verbal propositions.

Pictures aid in recalling information that has been associated with them. Upper levels of the cone need more instructional support than lower levels.

Evolving instructional strategies — some parameters

One may start evolving an instructional strategy from any perspective but somewhere along the line, the designer should ask himself questions similar to those listed below:

Does the instructional strategy:

- i) provide relevant concrete experiences and also help the learner to develop his own cognitive map (abstracts, concept map, flowchart, etc.) ?
- ii) move from the simple to complex tasks, familiar to unfamiliar concepts and illustrations?
- iii) follow the most effective psychological sequence, or does it rigidly duplicate the so-called logical sequence that is traditionally followed? (e.g. the text book sequence may not be the most effective).
- iv) encourage learners to develop new knowledge-discovery learning and inductive reasoning, even when a deductive method is followed; does it encourage the learner to subsume the new knowledge under the already formed concept network ?
- v) provide only one linear sequence, irrespective of the differences among the backgrounds of the learners or can it provide branching or more adaptive programmes to suit individual differences?
- vi) provide for a feedback process so as to make corrections, i.e., does it have a built in formative evaluation component or does it rely only on the last summative evaluation of the learners ? (end of the term results, eg external exam at the end of the year,)
- vii) provide gradual control to the learner on the learning process (does it give a learner, control over the time and speed at which he can learn the material? Or, is the process completely determined by the teacher or the media of presentation used e.g. in television programmes, as distinguished from a videotape, the learner is completely at the mercy of the television producer and telecasting agency as to when he should learn and at what speed ?)
- viii) provide opportunities to interact with the other participants (i.e, does the strategy force him to work in isolation, or with the teacher alone or provide him with interactive situation-opportunities for participative learning?)
- ix) provide learning situations which are just “bookish” or are they similar to real life (simulation of real life-on the job) situation?

One must, however, keep in mind that all these parameters are on a scale continuum i.e they are not like an “either or” situation, For example, most instructional strategies will involve both abstract and concrete experiences, both deductive or expository types and inductive or discovery types of learning, etc, A strategy could provide, more or less of the concrete and the abstract, or less or more discovery or, less or more of the deductive “type of learning experiences.

One has to select the appropriate point on the scale of that continuum, and again, the appropriateness is to be judged in terms of the effectiveness and the efficiency of the strategy.

Tryout and validation

Any strategy once designed, cannot be straight way accepted as the most effective one, even if it is designed by supposedly very senior professors or highly respected educational administrators. It has to be first tried out with a group of learners and shown to be effective, that is to say, it must be demonstrated that the students learn/achieve the instructional objectives that the strategy has been designed for. How does one collect the data for validation? This, you will study in Block 4.

Self- assessment

11. Which of the following statements are true?

- a) *An effective teacher designs different methods rather than use just one method for all purposes.*
- b) *One of the parameters within which a method is to be selected is the set of characteristics of the target group.*
- c) *According to E. Dale it is always better to provide concrete experiences to the learner.*
- d) *For adults, methods involving verbal abstract symbols are more effective and efficient, although this may not be so for children.*
- e) *What is simple to a teacher may be complex to a learner and vice versa.*
- f) *The sequence during learning should be similar to that used in the performance after the learning.*
- g) *It is always more efficient to memorise a poem part by part (or line by line).*
- h) *Modern science uses only inductive methods.*
- i) *The teacher's main job is to cover the curriculum prescribed for the examination.*
- j) *Developing a cognitive strategy is more important than memorising discrete information.*
- k) *Discovery learning is time-consuming and therefore impractical in a college context.*
- l) *All learning exercises must be structured.*
- m) *The only important function of feedback is to motivate a learner.*
- n) *Experience oriented methods like role-playing allow for a higher involvement of a learner than, say, reading a textbook.*
- o) *The modern trend is to give more control to the learner over his learning process, by making him a party to a contract of learning.*
- p) *If the learning experiences are similar to that of the performances expected in real life the transfer of learning to real life is easier.*
- q) *Media and methods should be combined to provide the different requirements of the learning process.*
- r) *Multi-media packages are always superior to a single method of teaching.*

In this unit, We have started our discussion with the concept of instructional strategy. It is a systematic process in which the learning experiences are logically and rationally structured to help the learners to acquire the terminal behavior and to achieve the instructional objectives. This unit has elaborately discussed the different instructional objectives as envisaged by Bloom. The Cognitive, Affective and Psychomotor domains of educational objectives are clearly defined and a detailed note is presented as to how these objectives can be presented in the instructional strategy.

This unit has given a clear view regarding the evolution of instructional strategy. At the end of the unit, some of the parameters that are to be taken into consideration while evolving instructional strategy were presented.

Unit-end activities

1. Visit any advertising agency and find out the steps involved in designing the advertisement for a particular product before actually launching a campaign?
2. Visit any library in the University setup and identify the various books/learning resource materials prepared in different instructional strategies. Describe how these are different from one another?
3. Identify the different websites on the internet related to e-Learning materials and analyse them on the basis of their content presentation.
4. Prepare an instructional strategy to teach any subject content of your choice for the undergraduate distance education students.

Points for discussion

1. How Instructional Strategies are essential for Teaching in Higher Education?
2. What are the different alternative instructional strategies presently being discussed in the context of adult education?

Suggested readings

Asubel, D.P (1963), *The Psychology of Meaningful Verbal Learning*. New York: Grune & Stratton.

Bloom, B.S. et.al. (1956), *Taxonomy of Educational Objectives : Handbook 1, Cognitive Domain*. New York : David Mckay (Co.) Inc.

Boocock, S.S. & Schild, F. (1968), *Simulation Games in Learning*. Beverly Hills : Calif, Sage.

Bruner J. (1961). *The Process of Education*. Cambridge : Mass, Harward University Press.

Dale, E. (1954). *Audio Visual Methods in Teaching*, New York : Holt, Rinehart & Wington.

Gagne, R. (1967), *Principles of Instructional Design*, New York: Holt, Rinehart & Winston.

Fry Healther, Ketteridge, Steve and Marshall, Stephnie (2003), *A Handbook for Teaching and Learning in Higher Education*. London : Kogan page.

Answers to self-assessment

1. Instructional strategy is a process which is systematically design to achieve the pre-determined instructional objectives.
2. Audience, Behaviour, Condition, Degree or Criterion.
3. The major categories in cognitive domain are: Knowledge, understanding, application, analysis, synthesis and evaluation.
4. The major categories in affective domain are: receiving, responding, valuing, organization and characterization
5. C
6. a, b, c, f, h, k
7. According to Bruner, one could start with fundamental notions about a subject and expand them to greater details even to abstract descriptions. This approach could be followed while evolving instruction and strategies.
8. According to Ausubel, all new knowledge or information get accommodated and assimilated with the existing cognitive structure. Therefore, before presenting any new information, it is relevant to provide advance organizers. This is coutribution Ausubel made for classroom instruction.
9. The steps in the evolution of instructional strategy are: Analysis design, development, implementation and evaluation.
10. (1) A, (2) B, (3) A, (4) C, (5) C, (6) C, (7) B, (8) A, (9) A, (10) B, (11) A.
11. a, b, e, j, n, o, p, q.

Unit and Topic Planning

Introduction

In the previous unit, we studied about the instructional objectives and how to develop instructional strategies. Instructional strategies are generally implemented through unit plan and topic or lesson plan. In this unit, we will discuss how to prepare a unit plan and a lesson plan.

Learning outcomes

After going through this unit, you will be able to:

- define a unit plan and a lesson/topic plan;
- differentiate between a unit plan and a lesson plan; and
- prepare a unit plan and a lesson/topic plan in your subject of study.

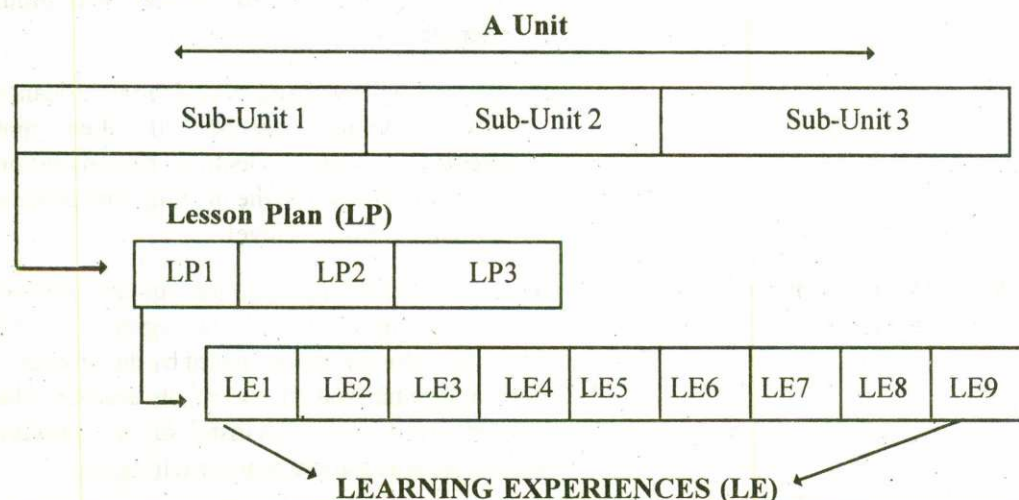
Unit plan

All of us know that we have to complete a particular course, or more popularly known as a syllabus, in a given academic session. Such a course or a syllabus comprise a number of chapters or units. Each unit consists of a quantum of knowledge which represents a particular theme. This body of knowledge has to be transacted in the class so that the objectives of teaching the unit are achieved by the students. This necessitates that the unit is planned in a systematic manner in advance in order to achieve the objectives of teaching-learning process. The main objective of a unit plan is to manage student learning in that unit. It represents sequencing of learning activities the unit and the supporting learning materials that are required for transaction of learning experiences.

Let us know the unit plan

As we said earlier, a course consists of a few units. A unit, similarly, comprises a few sub-units. Each sub-unit represents a bit of knowledge in that unit. Each sub-unit further consists of a few lessons. Each lesson again comprise a number of learning experiences.

Let us examine the Figure 1 in order to know the differences amongst unit plan, sub- unit and lesson plan.



LP = Lesson Plan

LE = Learning Experiences

Source: Dash, N.K. (2003). Power Point Slides for Teacher Education Workshop. SOE, IGNOU, New Delhi.

Therefore, when we plan for a unit, we generally plan for sub-units which are in that unit. A unit plan has five sections, namely, introduction, objectives, contents, hints for teachers and evaluation. The format and an example of a unit plan is given in Table 1.

Table 1: Format or a Unit Plan

Subject/Course : Unit: Class:			
● Previous knowledge/Entry behaviour of Students ● Major objectives of the unit ● Overview of the theme of the unit:			
1	2	3	4
Sub-Units Teaching topics No. of Periods	Major Teaching points under each topic.	Specific objectives of each teaching point	Methods/medial approach adopted by teachers' and pupils' activities Learning Resources
● Reference of pupils ● References for teachers ● Evaluation/Assignment			

Sample of a Unit Plan

1. Subject/Course : Instruction in a Systemic Perspective
2. Unit : Input Alternatives-Teacher Controlled
3. Class/Target Group : Students of PG Diploma in Higher Education
4. Entry Behaviour of Students : Students know the concept of instructional inputs. They carry on transaction of learning experiences with the help of such instructional inputs.
5. Major objectives of the Unit :
 - 1) Students will be able to know the meaning of the teacher-controlled instructional input alternatives.
 - 2) Students will be to understand the significance of various kinds of teacher controlled input alternatives such as : lecture, demonstration and team teaching in the instructional process at higher education level.
6. Overview of the theme of the unit : Teacher-controlled input alternatives refer to those instructional inputs in which the degree of control of the instructional environment by the teacher is more in comparison to that of the learner. The popular teacher controlled instructional inputs are lecture, demonstration, team teaching, etc.
7. Details of the Unit Plan

Sub-Units	Major Teaching Points	Specific Objectives	Methods/Media/Approaches
1. Lecture	1. Concept and Meaning a lecture 2. Steps in a lecture 3. Assessment of a lecture 4. Approaches to content treatment in a lecture 5. Lecture in combination with other methods and media 6. Versatility of a lecture 7. Advantages and Disadvantages of a lecture	● Students will be able to define the concept of a lecture ● Students will be able to describe the steps in a lecture ● Students will be able to carry out assessment of a lecture ● Students will be able to discuss various approaches to content treatment ● Students will be able to explain how lecture can be combined with other methods and media ● Students will be able to discuss versatility of a lecture ● Students will be to list the advantages and disadvantages of a lecture	Methods: Lecture, Discussion, Question-answer, Group Work, Project Work Media: Chalkboard, OHP, Charts, Audio / Video programmes Approaches: Teacher-Controlled Group-Controlled
2. Demonstration	1. Characteristics of demonstration 2. Principles of demonstration 3. Preparing classroom demonstration 4. Performing classroom demonstration 5. Assessing demonstration	● Students will be able to identify the characteristics of demonstration ● Students will be able to explain the principles of demonstration ● Students will be able to prepare for demonstration ● Students will be able to perform demonstration of a learning point ● Students will be able to assess the demonstration skills of a teacher	Methods: Lecture, Demonstration, Discussion, Question-answer, Group Work, Project Work Media: Chalkboard, OHP, Charts, Audio / Video programmes, Materials for demonstration of a science experiment Approaches: Teacher-Controlled Group-Controlled
3. Team Teaching	1. Origin team teaching 2. Characteristics of team teaching 3. Objectives of team teaching 4. Styles of team teaching 5. Instructional Values of team teaching	● Students will be able to describe the origin of team teaching ● Students will be able to point out the characteristics of team teaching ● Students will be able to enumerate the objectives of team teaching ● Students will be able to discuss styles of team teaching ● Students will be able to elaborate instructional values of team teaching	Methods: Lecture, Team teaching, Question-answer, Discussion, Assignments Media: Chalkboard, OHP Approaches: Teacher-Controlled Group-Controlled

8. References

Chauhan's S. (1989), Innovations in teaching learning process, New Delhi :Vikas Publishing House, Pvt. Ltd.

Dale, Edgar (1954), Audio-visual Methods in Teaching, New York : Holt, Rinehart and Winston

Ellington, H., Percival, F. and Race Phil, (2003), Handbook of Educational Teaching, New Delhi : Kogan Page India Pvt. Limited.

9. Evaluation/Assignment

- i) Define the concept of teacher controlled instructional inputs. How are they different from learner controlled instructional inputs?
- ii) What is a lecture? Discuss the steps of a lecture. Point out its merits and strengths.
- iii) Discuss, with example, how you can demonstrate a learning experience in Physics.
- iv) Should team teaching, be practised in colleges very often? Justify your answer.

Planning the daily topic/lesson

The topic is the smallest unit of a unit plan which contains similar elements arranged in much the same way to achieve the objectives as in the extended unit plan. The effectiveness of the unit plan is dependent on the efficacy of daily/lesson plans. The daily lesson plan consists of the following :

- i) Lesson objectives
- ii) Introduction section
- iii) Development section
- iv) Closing section

If these parts are systematically arranged, a format of the lesson plan can be developed covering the above five points as given in Table 2.

Table 2: Format of a Lesson/Topic plan

Subject:		Target Group:		
Topic:				
1. Entry behaviour				
2. General objectives of the topic				
3. Methods and Media				
4. Introduction				
5. Presentation				
Teaching points in sequence	Specific objectives in behavioural terms	Learning Experience		Partial Evaluation
		Teacher's Activities	Pupils' Activities	
6. Recapitulation/revision/evaluation				
7. Home assignment				
8. Blackboard work plan				

Thus, you must have understood that the five major parts are systematically presented in eight steps. This format is not rigid. The plan can be rearranged according to the needed end objectives.

But before going to the format of a lesson plan, let us be clear about the significance of each component or part of these lesson plans.

i) Statement of general and specific objectives

Give the idea of the long-term goals and observable end behaviour of learners which have been discussed earlier.

ii) Introduction or opener

The opener in a lesson plan prepares learners for new learning. At the same time, it may help them recall what they can remember from previous experience. In most cases, it is a link between the present learning experience and the learning experience which occurred in the few questions like: "What did we learn yesterday?", "Who remembers what we learned yesterday?"

Better openers are those that generate learners' interest. For eliciting greater interest you can use some of the following procedures depending upon the relevance and time available.

- i) Divide the class into "buzz" groups to interact for two or three minutes on what are the most important things to remember from their previous lesson.
- ii) Have a pair of volunteers play the roles of an interviewer and an interviewee interacting over the previous day's learning. If other members of the class disagree, they may re-enact the interview.
- iii) Prompt a class discussion with a "what" of a question demanding a recall of the previous learning for reasonable responses for three to four minutes.
- iv) Give three to five short-answer test items or quizzes or puzzles based on the previous learning. The test or puzzle is discussed and corrected immediately in the class.
- v) Invite a group to perform dramatisation to convey the previous learning. The other children participate by guessing or by watching and assessing the level of accuracy. The beginning of the lesson in most cases is concept-oriented. Often the success of a lesson depends on the quality of the opener or introduction.

iii) Presentation or development section

It is the main part of implementing the teaching plan through teaching/learning alternatives, that is, teacher's activities and pupil's activities. The total content is sequenced into teaching points and each teaching point is presented by relevant teacher activities and students' activities. While doing so partial evaluation is also planned as shown in the format of the lesson. During that stage the teacher and students may require to use instructional materials like textbooks, reference books, teacher collected set of pictures, photographs, newspaper clippings, teacher-made sketches, graphs, charts, diagrams, models, replicas or real objects, film strips, films, videotapes, etc. The selection of material you intend to use should be governed by the following criteria.

- i) They should convey needed information in a clear-cut and direct manner.
- ii) They should meet the learners' needs in terms of their level of skills in general reading and reading maps, globes, diagrams, charts, graphs and tables; in viewing and listening to specific purpose and in retaining what they read, view or hear.
- iii) They should provide for reasonable reconstruction of the reality they represent.

Therefore, during presentation the usefulness of instructional material is determined not by whether it is read, heard or viewed but by how purposefully it is used, what the teacher will do, instruct and provide facilities to engage the students in various activities to achieve the stated behavioural outcomes.

iv) Recapitulation or the closing section

This section of the lesson plan mirrors the objectives listed in the objectives section. For example,

- The students will answer the question.
- They will infer ideas, concepts, values or generalisations.
- They will establish cause-effect relationships.
- They may do all these procedures either through oral or written responses.

Ensuring that students will have an opportunity to meet the stated objectives is not the only concern of the teacher. The teacher's main concern is that the children learn. Teachers need to monitor both their own effectiveness as teachers and the students' progress. The final part of the lesson plan is labelled as "Evaluation". You as planner here respond to the following questions and get a feedback on your own teaching:

- i) How well did the children meet the objectives?
- ii) If all the children did not meet the objective, why not? What can be done in subsequent lessons to ensure greater success? In what way can opening procedures or developmental procedures or closing procedures be improved?
- iii) If all the children met the objective, was there any part of the lesson that could be improved to provide better transitions from one part of the lesson to the other?

Example of a lesson plan

Subject : Economics

Target Group : Undergraduate Students

Topic : Population Problem

I. Entry Behaviour

Students are aware of the "Population explosion" as one of the burning problems of India. Students know the factors of production and the characteristics of factors of

production as well. They are aware of labour as an important factor of production which is directly related to population.

II. General Objectives

- i) Students will appreciate the seriousness of the population problem.
- ii) Students will understand the relationship between population growth and the resources available in the country.
- iii) Students will understand why the population problem is more acute in developing countries than in developed countries.
- iv) Students will know that a speed increase in population is bound to be problematic for any country.
- v) Students will understand the reasons for the growth in population.

III. Methods

Question -answer, Discussion, Lecture

IV. Media

Blackboard, picture, chart

V. Approach

Comparative

VI. Introduction

Good morning, everybody! Today, I will present my lecture on population problem.

But, before we begin, let me show you some pictures. (Here the teacher will show four pictures one by one)

- Picture I - Fish swimming leisurely.
- Picture II - Fish swimming easily but not leisurely.
- Picture III - Congested -almost no space to move around.
- Picture IV - Cracked!!!

All of you have seen the pictures and must have identified some resemblance to one of the advertisements shown on television.

Now, tell me, why has this advertisement been shown/telecast in India?

Student: This advertisement is about the population explosion. And the population explosion is the biggest problem of India. It is shown in India to make the people aware of the population explosion and its impact on the country's growth.

Teacher: Very correct! It seems that all of you are aware of the population problem, the biggest curse of our country.

Now, today, we will try to know more about the population problem, especially from the economic point of view.

Teaching Points Sequentially Ordered	Specific Objectives	Teacher's Activities	Expected Pupil's Response	Evaluation
1. Over- Population	- Students will be able to relate population problem in context with quantum of existing factors of production. - Students will be able to state the reason for over-population being a hindrance in India's development socially and economically as well.	- Teacher will ask questions : - What are the factors of production? - What is the unique characteristics of labour as one of the important factors of production? - Teacher will explain how labour is directly related to population. - Teacher will explain how over-population itself is not problematic. - Teacher will give examples where increase in population may turn out to be a blessing viz. America. - Teacher will ask the students to give relevant examples.	- Student will answer the question asked by the teacher : - Land, Labour, Capital and entrepreneur - Living in nature. - Students will listen to the teacher attentively. - Students will give relevant example like- Australia and Singapore	Explain in your own words why over population is a problem in India and not in America or Australia.
2. World and Population Problem	Students will be able to write data regarding populations of developing as well as developed countries.	- Teacher will classify the countries into two : - Developed and - Developing - Teacher will explain that population problem is more acute in developing countries and not in developed countries.	- Students will note down the main point from blackboard. - Students will learn to the teacher attentively. - Students will answer the questions asked by the teacher (if any)	Explain in your own words why population problem is more acute in developing countries than in developed ones.

Teaching Points Sequentially Ordered	Specific Objectives	Teacher's Activities	Expected Pupil's Response	Evaluation
		3. Teacher will write on blackboard the Per Capita Income (PCI) of different countries like. 4. USA 34370, Japan 35,420 U.K. - 25,200 Sri Lanka- 890, Indonesia- 570 India 450	4. Students will ask the difficulties.	
3. India's population and reasons for its growth in	1. Students will be able to write data regarding India's population from 1901 to 2001 2. Students will be able to draw a line graph showing speedy increase in population of India. 3. Students will be able to state reasons for growth in populations. 4. Students will be able to state minimum two reasons for growth in birth rate.	1. Teacher will explain with the help of line graph the increase in Indian population. 2. Teacher will explain why is it called Population Explosion? In 50 years the population has increased by 66 cores. 3. Teacher will ask the students to take down population data while she writes on blackboard : 4. Teacher will ask the students the reason for growth in population.	1. Students will listen to the teacher attentively. 2. Students will note down the main points from blackboard. 3. Students will answer to the question asked (if any). 4. Students will ask questions/ difficulties (if any)	Explain in your words the reasons for growth in population in India.
	5. Students will be able to state at least two reasons for decline in death rate.	5. Teacher will give reasons for growth in populations- Difference between birth rate and death rate is high. Teacher will state reasons for this difference. Root of population problem lies in insufficient fall in birth rate.		

VIII. Recapitulation

Teacher will recapitulate by asking questions:

1. Why is over-population a blessing in America and Australia?
2. Why is over-population a problem in India?
3. Why is the population problem more acute in developing countries.
4. What factors are responsible for the growth of population in India.

XI. Blackboard Summary

Population Problem	
Over-population	India's population
World & population	1901 – 23.6 crores
Per capital income (1988)	1951 – 36.0 Crores
USA – 34,370\$	1991 – 84 Crores
JAPAN – 35,420\$	2001 – 102 Crores
U.K – 25,200\$	Reasons
Sri Lanka – 890\$	Difference between Birth rate and Death Rate
India – 450\$	

Source : <http://www.worldbank.org>.

X. Assignment

Write an account on : “Ever increasing population - an obstacle to the social and economic development of a country”.

Summary

In this unit, we focused on unit and lesson/topic plan. In order carry out a course it is necessary to prepare detailed unit plans for each unit. Unit plan helps a teacher to manage teaching-learning activities more effectively and efficiently. We presented an example of a unit plan on the unit—Input Alternatives—Teacher controlled of this block. We also discussed the difference between a course, a unit, a sub-unit and a lesson. Unit plan generally refer to planning for sub-units. A sub-unit consists of a few lessons. Each lesson has to be planned. We also presented an example of a lesson plan. These examples of unit and lesson plans may help you to prepare similar plans in your subject of teaching.

Unit-end activities

Prepare a few Unit plans in a subject of your choice, Then, prepare lesson plans which are to presented under one of these units.

Suggested readings

School of Education (1998), ES-343 : *Teaching of Social Studies, Block-1, Padagogy of Teaching Social Studies*, New Delhi : IGNOU.

