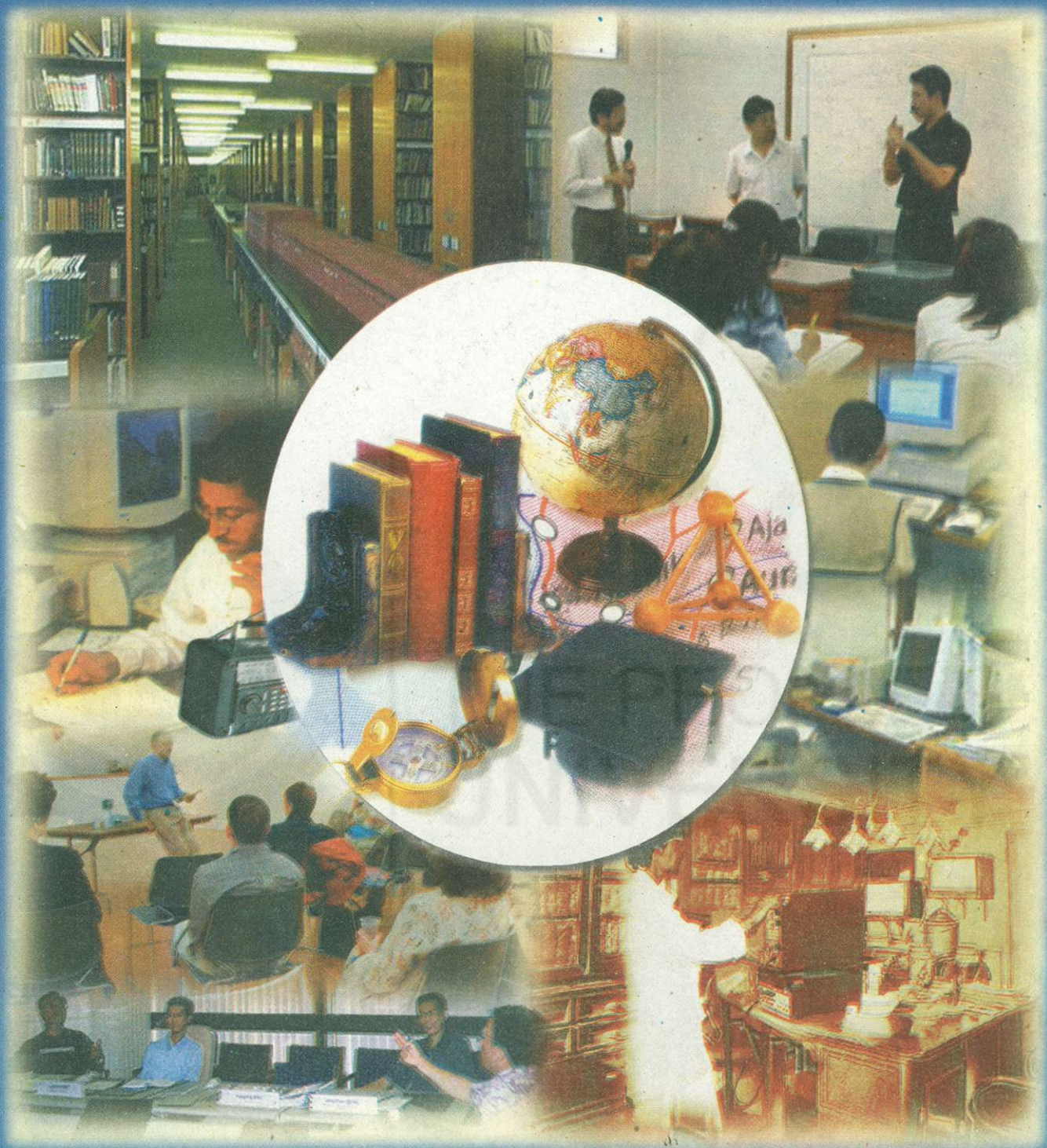




Indira Gandhi National Open University
School of Education

MES-102
Instruction in
Higher Education



Communication Skills

2

"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



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MES-102 *Instruction in Higher Education*

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- Unit 4 Evolving Instructional Strategies
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Block 2 Communication Skills

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THE PEOPLE'S
UNIVERSITY

Block 2 Communication Skills

Introduction to the Block

Having provided you with a repertoire of instructional methods, techniques and strategies in Block 1, which you may use as inputs in an instructional system, we now focus our discussion on the process dimension of it. Block 2, therefore, deals with the competencies and skills that a teacher should have in order to operate instructional inputs. Here we have tried to present you with the skills of lecturing, conducting interaction sessions and using communication aids which help a teacher in the transaction of teaching-learning.

Unit 6 of this Block begins with defining teacher competencies and presents the concepts of teaching and teacher competencies at the tertiary level. We then identify the different areas of classroom instructions where teacher competencies can be developed.

In Unit 7, we enumerate the skills associated with a lecture. Beginning with different ways of organising content, we proceed on to specific skills involved in the introductory, development and consolidation phases of a lecture. We also talk about the general skills which every teacher is expected to utilise throughout the delivery of a lecture. We also discuss pitfalls associated with a lecture.

In Unit 8, we point out importance of an interaction session and the tasks undertaken in it. We narrate the skills required by a teacher to organise, arrange and conduct an interaction session. Then we mention seating plan for an interaction session and the norms to be observed. Lastly, evaluation of students' performances during an interaction session, has also been touched upon.

The skills of using some of the commonly used communication aids, constitute the content matter of Unit 9. Having given the need of communication aids in the instructional process and a broad classification of communication aids, we describe the skills associated with some non-projected and projected communication aids. In this context, we discuss some non-projected aids like chalkboard, chart, Posters and models and their uses, as well as some projected communication aids like slides, filmstrips, OHP, computer and computer-assisted learning.

In Unit 10, we discuss the role of emerging communication and information technologies in the changing scenario of the teaching-learning process. In this connection, we describe uses emerging audio-video technology, computer technology, telecommunications and networks, and internet and intranet.

Teacher Competence in Higher Education

6

Introduction

You know that, as teachers, our main aim is to make students learn effectively and efficiently. For doing so, a teacher has to do several activities such as plan properly, provide effective instruction and evaluate the learning using appropriate methods and techniques. That means, a teacher has to perform a host of activities inside and outside the classroom. You also know that effectiveness or ineffectiveness of teaching is closely linked to teacher competence. Competent teacher would also create classroom conditions and climate, which are conducive for student learning.

In this unit, you will be studying the meaning and importance of teacher competence in general and also with specific reference to teaching. Apart from this you would know how the competencies of a teacher at the tertiary level could be classified.

Learning outcomes

After going through this unit you should be able to:

- define the concept of teaching;
- analyse the various views and points with regard to teacher competencies;
- assess yourself as to whether you possess the required teacher competencies; and
- plan to master the teacher competencies that are necessary in respect with the learners' group that you are dealing with.

The concept of teacher competence

In order to understand what we mean by teacher competence, let us first examine the term "teaching" in more detail.

What is teaching?

In the Units of Block 1, we have been using the terms "instruction" and "instructional process" to include all instructional experiences that are provided to the students, irrespective of whether the teacher is involved with them or not. What then would the term "teaching" mean? Let us look into this in this section.

Some educationists consider teaching to be a broad concept which includes all activities to be carried out for organising learning experiences. In this Unit we shall consider "teaching" in the narrower sense of the term – even narrower than the term "instruction".

Let us take an example, consider the following activities:

- i) teacher presents a lecture
- ii) teacher conducts a discussion session
- iii) students learn from the self-instructional material.

Are all these teaching activities?

We shall consider only the first two (I & ii) activities as part of teaching, in this Unit. The third activity does not have the direct involvement of teachers, although it is also very much a part of the instructional process. Hence, all the three activities are components of the instructional system, but only the first two can be considered strictly as teaching.

There are many more activities apart from these that the teacher has to perform in the classroom and outside it in order to provide the required learning experiences to students. Some of these are, planning for the class, preparing the necessary learning material, giving a demonstration, conducting seminars and supervising practical work. There are many more. All of these comprise teaching activities. And hence, one may say that teaching is what the teacher does not only for providing instructional experiences, but also for generating a climate conducive for learning. This would mean that 'teaching' will also include maintaining discipline, etc.

It is clear from the preceding discussion that teaching is what the teacher performs for the organising of learning experiences as well as for providing the supporting climate necessary for effective learning.

Teacher competence

Before knowing the meaning of teacher competence, it is essential to know the meaning of competency. Competency is a term used extensively by different people in different contexts. So it is defined in different ways. Teacher education and job performance of a teacher are the contexts in which this term is used. Competencies are the requirements of a competency based teacher education, which includes knowledge, skills and values the trainee teacher must demonstrate for successful completion of the teacher education programme (Houston 1987). A few characteristics of a competency are as follows.

1. A competency consists of one or more skills whose mastery would influence the attainment of the competency.
2. A competency has its linkage with all the three domains under which performance can be assessed. It covers the domains of knowledge, skill and attitude.
3. Competencies, since have a performance dimension of them, are observable and demonstrable.
4. Because the competencies are observable, they are also measurable. It is possible to assess a competency from the performance of a teacher. It is not necessary that all competencies of a teacher have the same extent of knowledge, skill and attitude. There may be some competencies of a teacher which have the same extent of knowledge, skill and attitude. There may be some competencies involving more of knowledge than skill and attitude, whereas, some competencies may be skill/performance loaded.

You know that there are a large number of instructional and related activities to be performed by the teacher inside and outside the classroom. These activities are of varied types. The effective organisation of these activities would require that a teacher possesses a certain amount of knowledge and also certain attitudes and

skills. This is known as teacher competence. In other words, teacher competence refers to “the right way of conveying units of knowledge, application and skills to students”. The right way here includes knowledge of content, processes, methods and means of conveying content.

Any definition of teacher competence depends on teaching in a particular setting, the culture and values held in the community. It also depends on the innumerable teacher and student characteristics and the classroom context. Nevertheless, in order to know if we possess the necessary competencies in a given situation, we have to be judged on the basis of our ability to produce certain effects. But, there are as many ways of being effective as there are effects. Moreover, there could be disagreement even amongst ourselves over the effects that a teacher is expected to produce. It calls for value judgements and decisions as to how we wish to view teaching.

The research studies conducted so far, indicate that there does not exist a single set of competencies which all the effective teachers possess or all the ineffective ones lack. We should collect information regarding when, how, who and what the purpose of each competency is most likely to be useful to. In other words, the concept of teacher competence is highly situational one and involves value judgements where on one absolute set of competencies is effective in relation to all kinds of learner groups. There are many different sets that are relevant.

Self-assessment

1. Which of the following statements are true?
 - a) There is one definite set of competencies which all teachers must possess, to become effective.
 - b) Teaching competencies refer to teachers' knowledge as well as skills.
 - c) All effective teachers are scholars in their own discipline.
 - d) Subject matter expertise, by itself, does not make one an effective teacher.
 - e) Competencies have a performance dimension to them; hence they are not observable and measurable.
 - f) Planning for the class, preparing the necessary learning material, giving demonstration, conducting seminars are teaching activities.
 - g) Right way of conveying units of knowledge, application and skills to the students is considered as teacher competence.

Teacher competencies at the tertiary level

In this section, we shall arrive at a set of teaching competencies that a teacher at the tertiary level needs to possess, in order to be effective. As we mentioned earlier, the kind or repertoire that a teacher should have, depends on the actual situation, and the demands that it makes on the teacher. The list that we provide, therefore, would not be exhaustive; you could probably add to it, other competencies that are relevant to your situation.

As we know, there are many roles that a teacher is expected to perform both inside and outside the classroom, and at times, even outside one's institution. For the purposes of this discussion, we shall limit ourselves to the teacher's roles inside the classroom. However, we shall consider the work he/she has to put in, by way of planning, combining the content of the subject, with the materials needed for the class, etc., as part of the teacher's repertoire. In other words, we shall include in

our discussion, those abilities and skills that make a teacher competent inside a classroom, and which may also have to be displayed outside the classroom.

Classification of teacher competencies

There seem to be different ways of classifying teacher competencies. One has to look at it in terms of teacher functions. Essentially, teachers have two major roles in the classroom:

- i) to create the conditions under which learning can take place i.e. the social side of teaching
- ii) to impart, by a variety of means, 'knowledge' to their learners – the task oriented side of teaching.

The first we could term as the 'enabling' or *management* function and the second, the instructional function. These complement each other as the latter would be, more or less impossible without the former. In practice, it is very difficult to separate the two and often, one performs both functions simultaneously.

Management function

What does the management of the learning group entail? While setting up learning activities in the classroom, the teacher is often required to play a managerial role which includes motivating, organising the learning group, classroom management (control and discipline) and evaluation.

Instructional function

The instructional side of a teacher's role includes different presentations and communication skills like lecturing, questioning, explaining, dramatizing, using audio-visual aids, etc.

Another way of classifying teacher competencies is to look at teaching essentially as something that is obtained in the classroom, i.e. **classroom interaction** involving the teacher, the students and the different contexts/opportunities that are set up for facilitating learning. These contexts/opportunities include the different teaching modes (discussions, demonstrations, lectures, etc.), evaluation, motivation, classroom management, and constitute the process aspect of teaching. These have certain antecedents to it that mainly include planning and knowledge of subject matter.

Table 1 provides further detailing of the functioning of planning and interaction in classroom.

Table 1 : Function of Planning and Interaction in classroom

Planning	Interaction in classroom
Setting objectives	Diagnosing
Need analysis	Motivating
Selecting content	Presenting
Selecting method	Questioning
Preparing teaching materials	Controlling
Preparing evaluation tools	Discussing
	Evaluating
	Providing feedback
	Answering

“One more way of classifying teacher competencies, according to the National Council for Teacher Education (NCTE) is as follows:

- Contextual Competencies
- Conceptual Competencies
- Content Competencies
- Transactional Competencies
- Competencies Related to other Educational Activities
- Evaluation Competencies
- Management Competencies
- Competencies Related to working with Parents
- Competencies related to working with Community and other Agencies

Repertoire of teaching competencies

Whichever way we would like to classify teacher competencies, the teacher's repertoire would seem to constitute the following:

- i) Knowledge of subject matter
- ii) Planning for the course/lesson including teaching strategies, teaching materials, and classroom organisation.
- iii) Motivating learner groups
- iv) Presentation and communication skills including lecturing, explaining, eliciting response, questioning, discussing, dramatizing, reading, demonstrating, using audio-visual aids, etc.
- v) Evaluation includes informal observations of student progress, diagnosing learning difficulties, encouraging peer/self-evaluation, handling evaluative discussions, etc.
- vi) Classroom management and discipline.

Different units in this course have dealt some of these competencies in detail. In the following we shall look more closely at some of the competencies, which have not been discussed elsewhere in this course.

Knowledge of Subject Matter

Adequate knowledge in the content areas would be essential for any teacher to perform competently. The acquisition of knowledge and understanding of any subject would not be just a matter of collecting facts and information about the subject, more importantly, it is learning to think in a way that is characteristic of that discipline be it Mathematics, Physics or History. For example, a teacher of Physics expects knowledge about the physical world or arrives at generalisations regarding the physical phenomena not by authority of another person or a book but by a verification process, which is typical of the way in which the knowledge in Physics is built. Also, the knowledge, thus, acquired are organised conceptually to provide a conceptual structure to the discipline of Physics, which is coherent and stable.

Furthermore, the way a teacher 'handles' a subject or a discipline is influenced by his/her beliefs and attitudes with regard to the subject. Researches have identified two basic types of teachers. These are not absolute opposites but are persons with tendencies towards one extreme or the other. Now, read through the statements given below and indicate whether or not you agree with them and whether or not you believe in them.



Figure 1: Now, where did I stop my lecture yesterday?

One type of teacher believes that:

- Disciplines such as Physics, Chemistry, Sociology, Anthropology, and Languages, have distinctly different structures.
- There are very distinct boundaries between these disciplines and one should not try to **intermingle** them.
- Each discipline has a large 'content' and 'information base' which has to be learnt.
- There are appropriate standards of performance in each discipline,
- Learners' performances can be evaluated according to the standards laid down by that discipline.
- The teacher's main task is to evaluate and correct learners' performances.

The other type of teacher believes that:

- The ability to organize thought, to interpret facts, and to apply them, is more important than the knowledge of facts or the widening of information base.
- Learners are intrinsically interested and naturally inclined to explore new worlds.
- The teacher's main task is to set up dialogues in which learners reshape and reorganise their existing knowledge through interaction with others.
- Learners are as capable of setting up the criteria for assessment of performance as the teachers.

- Learners already know a great deal and also have the ability to extend and refashion their knowledge.

These two different sets of beliefs have several implications in the teaching style and classroom management activities. The first type of teacher, also called the transmission teacher, will need to maintain a high degree of control over the learners in order to create the conditions under which the subject can be right. The other type of teacher, called the interpretation teacher, would prefer to allocate the responsibilities for learning amongst the learners. Control is maintained by persuasion and by appeal to the better judgement of the learners.

But, in actual practice one has to arrive at some synthesis of both these sets of beliefs, depending particularly on (a) the entry behaviour of the learners- their previous knowledge and their ability to comprehend and learn on their own, etc. and (b) the structure of the topic that one is being introduced.

Planning

Teachers' planning refers to that aspect of teaching where teachers formulate a course of action. It is an activity that is typically carried out in the absence of students and before the actual teaching. Teachers' plans, which serve as 'scripts' (whether they are done on paper or in one's mind), include decisions on what to teach and how to teach the chosen content.

Long range planning or planning for a semester or a year, may not involve deciding what to teach- if the course of study is prescribed for a given level. But even here, it would still involve deciding what to teach first, and what next and also planning for other supplementary activities that might act as a 'bridge' or a "gap-filling exercise". It also includes some kind of (probably an informal) assessment of what students come to teachers for. This may not uniformly relate to the entire class. For example, if it is the first year undergraduate General English class, you would have to think of where all students have come from, like say, whether they belong to an English medium stream or are from different regional languages medium. If it is the latter, then, the number of years of formal training in English of each has to be considered. So also, what would be the likely proficiency level of each of them. Long range planning also involves the (re)structuring of the course and the kind of treatment that each unit/topic/lesson should receive; deciding on which one(s) should be dealt with in details and which cursorily, which ones need more time and effort on the teacher's and student's part and which don't.

You have already studied the different aspects of Unit and lesson planning in Unit 5 of Block 1. The competencies required to perform those tasks involved in planning are mostly cognitive and can be mastered by practice.

Motivation

Even when the plan is good, an important function of the teacher in implementing it, is to motivate those learners who are demotivated to the task of learning and nurture those who are already well motivated. There are several ways in which one can achieve this:

- by giving students meaningful, relevant and interesting things to do;
- by adopting a positive attitude towards learners (praising and encouraging the positive efforts by learners will help to keep up motivation);
- by giving encouraging feedback to their responses to oral questions or written assignments;
- by involving learners in the classroom activities that demand inter-student communication and co-operative efforts on their part;

- by linking the day's lesson with that of the next and also (if possible) to other subjects by drawing from their past experiences and proceeding at a pace that is most suitable to them;
- by building into the tasks, some amount of flexibility, so that learners with varying abilities and experiences find them challenging enough even while, not frustrating their efforts.

Presentation and communication

After ensuring the students' interest in the learning, a teacher in the classroom is to transact with the students in the context of a specific subject matter. The teacher is expected to communicate with the students in a number of ways so that the learners attain various types of learning outcomes. In order to achieve this effectively, the teacher may have to manifest various types of skills including lecturing, explaining, eliciting through questions, conducting discussion, dramatizing, reading, demonstrating; using audio-visual aids, etc. all these may be categorised into skills for effective presentation and communication in the instructional situation.

Evaluation

Evaluation of the students' achievement of a pre-specified objective is part and parcel of a teacher's function, what would these evaluation skills include? Preparing question papers? Taking viva voce? Yes, all these are included in the evaluation process. But these are only a part of the total evaluation function of a teacher. He has to observe the students in many different situations in order to judge the extent to which the expected terminal behaviours have been actually achieved by them. This includes so many activities. A teacher has to, first of all, select the suitable techniques and tools of evaluation. It is obvious that one cannot measure the length of a stick by using a weighting machine. Similarly, for measuring the skills of performing experiments, one cannot have a written examination. Hence the teacher has to select the suitable techniques and tools for measurement according to what he would like to measure.

Once the tools are decided on, one has to set about measuring the concerned behaviour. This would give the actual achievement of the terminal behaviour. A teacher should compare the actual terminal behaviour of the students with their expected behaviour. This helps him to judge the extent to which the expected terminal behaviour has been achieved. The gap between the two indicates the areas in which the students have not learnt. The teacher should make use of this feedback to improve his teaching as well as to provide the necessary remedial help to the students.

All these activities mentioned, need competencies on the part of the teacher. Let us call them Evaluation Competencies (More about these, you will know in Block 3 and 4).

Classroom management and discipline

Instructional process in the class can go on effectively only when there is a healthy and conducive climate in the class. Thus, classroom management becomes a very critical function of a teacher. The teacher has to possess various skills which would help him in managing the class in such a way that a healthy and conducive climate prevails. These skills are so important that, unless a teacher possesses these to a reasonable extent, he/she will not even be able to stand up or stay for a while in a class to manifest his presentation or evaluative skills, however proficient he may be:

Self-assessment

2. Which of the following statements are true?
- a) A teacher to be effective, does not have to be an orator.
 - b) Classroom management is the job of a principal or a similar administrative authority and not that of a teacher.
 - c) Evaluation of students' progress is not the job of a teacher; it is the function of an external examining body.
 - d) The most important function of a teacher is to cover the prescribed curriculum.
 - e) One of the important functions of a teacher is to interpret the prescribed syllabi in the context of long-term goals of education, like helping students to learn to think for themselves, solve problems, etc.
 - f) While selecting methods for teaching, a teacher should check the background and interest of the students.
 - g) It is possible to transform a lecture into a two way communication by introducing the question and answer method.
 - h) The transmitter model of teaching is more useful to learners than the interpreter model of teaching.
 - i) Even an experienced and senior teacher should plan his lecture before addressing a group.

How to improve classroom practice

Improving classroom practice depends solely on the competencies of a teacher. Hence, the teacher competencies discussed in the previous section, would help considerably, improve classroom practice. Apart from these, a teacher should take into account certain other aspects. They are discussed hereunder.

Mediating between theory and practice

Any change or improvement in the classroom practices occurs in more than one ways. It may be prompted by the findings of research on teaching or it could also be due to some policy decisions taken by the administrative body, which issues directives for changes in the existing practices. Under both these circumstances, the teacher, who is the practitioner at the classroom level, mediates the change. Teachers translate principles into practice and turn ideologies into realities in the classroom. Hence, a teacher needs to consider this role expectation seriously in order to be effective in classroom practice.

Whether we are experienced teachers or not, or whether we are trained in the methodology and theory of teaching or not, we do have certain (strong) ideas as how we should teach, probably, from our experience of being students. Therefore, we teach the way that we were taught or the way we are used to. In other words, we cope with complexities of the classroom in various ways, be it just lecturing on a particular topic, or handling an unexpected, disruptive behaviour of the students, which would probably be different from that of other teachers.

The mundane nature of the techniques that we employ often makes them simple to us, sometimes so trivial that we tend to use them as a set of routine procedures. These techniques, however, simple they may seem are based on some principle or theoretical standpoint. The important point here is that, we teachers should be able to understand the relationship between theoretical principles and practical techniques. It is this understanding of theory that enables a teacher to effectively play the role of a mediator of changes in pedagogic practices.

These techniques, however mundane or trivial they might seem, are based on some principle or other, which in turn is accountable to theory. The important point here is that, we teachers should be able to understand the relationship between theoretical principles and practical techniques. This understanding will enable us to mediate changes in pedagogic practice.

What this amounts to then, is that teachers should see all the established methodologies and techniques only as a framework for pedagogic activity and not as a set of fixed formulae. And if they are to see them as such, they need to understand the principles on which such techniques are based. Otherwise the techniques cannot be modified to accommodate new insights and experiences. Competent teachers adjust the teaching procedures, modify plans, and in general, relate an instinctive hypotheses to actual classroom setting. They refer techniques back to principle, testing each one out against the other in a continuous process of experimentation. They are research minded in the sense that they question, analyse and think critically about what is with them/given to them by way of technique or methodology. Thus, this spirit of enquiry, is a pre-requisite to good teaching.

Teacher's self-improvement

The need to improve one's performance and to excel in one's own job is felt by most of us-as adult intelligent persons. The question then is how does one go about it?

The key to the self-improvement programme is self-monitoring and self-correcting. For this, the teacher has to collect data regarding his own teaching performance and its impact on others — students, colleagues, etc.

There are many procedures to collect such data. Some of these are utilized under techniques such as Flander's Interaction Analysis, Micro-teaching and Competency Based Teacher Education (CBTE).

The common elements in all these three procedures are:

- i) Explicit statement of the competency/skill in terms of the teacher's behaviour
- ii) Some explicit procedure of recording and coding that behaviour objectively
- iii) Usually the procedure involves observing the teacher in actual teaching situation or in a simulation situation. These observations could be through (i) a video camera (ii) an audio tape recording (iii) peers/colleagues/ supervisors and /or (iv) students.

Now read a competency scale given in Table 2. This scale is restricted to only an instructional process in the classroom. Many similar scales are available to help a teacher to collect the data regarding his/her teaching behaviour.

Table 2: Classroom Teaching Competency Scale

Items		Rating					Remarks
1.	Teacher is clear about his instructional objectives	1	2	3	4	5	
2.	Content is appropriate to objectives and level of students						
3.	Content is broken into small bits in order to enable students learn step by step.						
4.	Learning of concepts and principles is ensured through relevant and concrete example						
5.	Sequencing is logical/psychological.						
6.	Teaching methods are appropriate to content.						
7.	Introduction is effective, draws students' attention and establishes rapport						
8.	Teacher encourages active participation by students.						
9.	Teacher encourages question – answers by students						
10.	Students feel free to clarify doubts-ask questions.						
11.	Teacher gives positive reinforcement to students.						
12.	Teacher's communication is effective, audible, and interesting.						
13.	Chalk board/OHP use is appropriate.						
14.	Assessment of students' attainment in relation to objectives is appropriate						
15.	There is proper linkage of main points at the end						
16.	Planning of lesson/preparation of materials is appropriate						
17.	Teacher is confident in content						
18.	Students feel that they learnt what the teacher attempted to teach.						

1-unsatisfactory, 2-below average, 3-average, 4-above average, and 5-outstanding

Such a scale can be given by teacher to his peers/supervisors for rating his/her own behaviour; and later he can discuss with the observers the specific behavioural indicators/skills which he should improve upon.

Essentially all these sum up to getting unbiased and specific data for assessing one's own behaviour and then planning one's own training/learning in terms of the strengths and weaknesses revealed by that assessment.

Objectives of training students

A last but a very important question, we 'competent' teachers should ask ourselves is, "what should we train our students for?" as we have learnt in the previous section, we might belong either to the transmission type or to the interpretation type of teaching, or choose to remain somewhere in the middle, depending on the subject we teach and what the examinations demand of students, etc. But we should also be aware of the gradual shift that is occurring in the focus of education- the shift from memorizing and hoarding of information to thinking and assimilating. The questions that we should ask ourselves are:

- i) Do we want our students to think for themselves, or do we want them to merely memorize what other people have thought?
- ii) Do we want our students just to reproduce facts from books (or our lecture notes), or do they develop their abilities to think and reason for themselves?

If the intention is that we want our students to think for themselves, then we may want to (re)define our role with that as the goal of education.

Then the next questions for us would be – "Are we doing enough to make our students think critically?" Do the teaching strategies that we plan for them to be engaged in, facilitate this in the class?" can lecturing for example, be an effective way to achieve this end? Lecturing could be an effective way of teaching students who **listen actively**. How is active listening different from passive listening? Active listening involves subliminal questioning like – how does this relate to that? Is this more important than that? Active listeners don't try to take everything down, which we see a lot of students do. (But people who are not listening at all also cannot take any notes, so let us not get misled!). Can we make them more skeptical and research minded (as we discussed earlier under 6.6.1). Or does our lecture tend to be an inquiry centred learning? Can we think of some questions (to be interspersed with a lecture) which might help students focus on some crucial aspects and probe into them even further?

If we adopt only discussion methods, it may be too much hard work, it may take longer; therefore, we may not be able to cover the entire text book or syllabus. Some say that the temptation to cover content with didactic knowledge is the major barrier to real learning at the college level. Do you agree with this view? And again, on the other had, if a teacher covers the materials, does it mean that the students have learnt their lessons? Or does learning mean just engaging the students all through their class hours? How do we reconcile the two?

These questions go on. The more we question, the more we will need to question. But unless we question the established practices (we ourselves are a party to them in the classroom), we will not be able to shake off the feeling of adequacy and complacency that will, otherwise, creep in easily, and which is very necessary for professional development. We are engaged in the continuous process of unraveling and refining our implicit theories.

Whether we would like to view a teacher's role as that of a knowledge transmitter/impartor, a facilitator of learning, or just as creator of conditions conducive to learning. The teaching emerges as an instructional systemist who decides how the goings-on of the classroom should be shaped. On him/her depends the meaning of education vis-à-vis teaching-learning taken on in their real contexts.

Self-assessment

3. *How can a teacher improve himself/herself so as to foster better teaching learning?*
4. *What is the objective of training students?*

In the beginning, we held the view that teaching competence is a crucial component which has significant implications while the instructional process is organised. This cuts across both roles of a teacher i.e., as an input and as a systemist. It has various dimensions such as content knowledge, instructional planning, student motivation, presentation and communication skills, evaluation competencies and classroom management skills. While the teacher would require all these dimensions to a reasonable extent, it is in the manifestation of these in an integrated manner that makes him effective in the classroom context. In the end, we discussed how to develop classroom teaching practice. Also, we provided an example of classroom teaching competency scale to evaluate one's teaching performance.

Unit-end activities

1. List a few activities, which according to you, come under good teaching.
2. Analyse your functions as a teacher in under-graduate and post-graduate classes and list out the various activities, skills which you perform. Classify them into various categories of teacher competencies.
3. Develop a classroom teaching competency scale like the one mentioned in the Unit. Evaluate your teaching performance with the help of that scale.

Points for discussion

1. If an experienced teacher is not proficient in certain teaching competencies, can this be improved?
2. Teaching competencies that are required for various levels of teaching would differ – Do you agree? What could be the difference between a set of competencies required for teaching under-graduate students and that of guiding M.Phil. or Ph.D. students.

Suggested readings

Anderson, Lorin W. (1989). *The Effective Teacher: Study Guide and Reading*. New York: Random House.

Dunkin, M.J. and B.J. Biddle (1974). *The Study of Teaching*. New York: Holt Rinehart and Winston.

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Jangira, N.K. (1982). *Core Teaching Skill — Microteaching Approach*, Delhi. NCERT

Kourilsky, Marilyn and Lory Quaranta (1987). *Effective Teaching, Principles and Practice*. Illinois: Scott, Foresman and Company.

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

Passi, B.K. (1976). *Becoming Better Teacher, Micro Teaching Approach*. Ahmedabad : Sahitya Mudranalaya.

Answers to self-assessment

1. b. d. e. g.
2. a, e, f, g, i
3. A teacher can improve himself-herself, if he/she monitors his/her teaching performance regularly. For this, the teacher may take the help of standardized scale or develop a scale of his/her own through which he/she can assess his/her own teaching performance.
4. The objective of training students is to help our students to reason and think for themselves. In other words, the main objective of classroom teaching should be to develop students' independent thinking.

Skills Associated with a Good Lecture

Introduction

You are already familiar with a wide variety of input alternatives from lecture to field work. you are also familiar with the viewing of the course curriculum as a whole and with the planning of an integrated strategy by properly selecting and sequencing the inputs to achieve a wide variety of output specifications (both long-term and short-term)

One of the input alternatives that you will be using very frequently is the lecture. you have read about this in Unit 2 Block 1. You broadly know the steps to be taken in any effective lecturing. In this unit we shall discuss more in detail, the skills required to become an effective lecturer i.e., the skills associated with the design and delivery of a good lecture.

Learning outcomes

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

- organise the content in appropriate ways in order to make it meaningful to the learners;
- describe the activities during the introductory phase of the lecture;
- describe the activities during the development phase;
- identify the activities during the consolidation phase;
- illustrate the skills associated with the delivery of the lecture; and
- identify the skills that you require to become an effective lecturer.

Activity-1

1. Think of a topic from the discipline that you are teaching and note down how you would proceed step by step in organising your thoughts before going to the lecture room. What are the activities that you would undertake in order to ensure a satisfactory delivery of the lecture? Note this down on a sheet of paper and compare it with the one given here.
 - i) Read about the topic from identified sources like text books and reference literatures
 - ii) Note down the teaching points on a sheet of paper.
 - iii) Arrange the teaching points in a logical sequence.
 - iv) Identify the necessary illustrations, examples, analogies and the like required for explaining the various teaching points.

- v) Identify the media hardware to support your lecture.
- v) Select or prepare the software for the identified hardware.
- vi) Sequence your activities during the lecture.
- vii) etc. etc.

If your list is more or less like the one presented above, you are on the right track. Let us, now, discuss skills associated with lecture in the coming sections.

Content organisation

This becomes a major skill in the design of any one of the input alternatives including the lecture.

Content organisation and university prescribed syllabi

Topics in a course could be arranged in several ways. As you know, every discipline has its own structure that organizes its content. Hence, topics in different disciplines may demand different ways of organization of a lecture. Here are some examples of organizing a lecture in accordance with the contents therein.

- **Topical:** A Psychology lecturer arranges the contents pertaining to study of human behaviour by different theorists under five groups viz., Social learning theorists, developmental theorists, psychoanalytic theorists, cognitive theorists and behaviouristic theorists.
- **Causal:** A teacher of Economics approaches different factors that affect the distribution of wealth as the labour market, taxation policy and social mobility.
- **Sequential:** A lecturer in a University Department of Education approaches the national system of education by discussing the preschool elementary, secondary, higher secondary and the higher education in India.
- **Symbolic/Graphic:** A lecturer of Biology begins each of her lectures by projecting the same transparency of a diagram of the human brain. Using a plastic overlay, she then draws in those structural details relevant to that day's lecture.
- **Structural:** A teacher of Educational Technology discusses projection systems in the same consistent format: the hardware, the working principle, the software and its design, the guidelines for use, maintenance, its advantages and limitations.
- **Problem-solution:** A faculty of Engineering looks at a series of structural failures in various types of buildings and the corrections needed in the design and construction of buildings.

Content organisation — some parameters

A teacher cannot choose his style of content treatment arbitrarily. He has to keep in his mind a number of parameters. These may include learners' abilities, interest and the psychological sequencing. There are mainly three kinds of psychological sequencing the teacher can refer to, while deciding a particular style of treating the content. These are:

- a) familiar to unfamiliar
- b) simple to complex
- c) ensuring success experience - rewarding.

a) Familiar to unfamiliar

The teacher is required to organise the content in such a way that the examples, illustrations, etc., that explain the content must start with the familiar situations or events of the learner. From these familiar experiences of the learner, the teacher leads him to unfamiliar experiences. For example, a Political Science teacher may start with the Village Panchayat before giving a talk on the Lok Sabha.

b) Simple to complex

The second way of organising the content may be done by the teacher in a way wherein simple concepts are presented first to be followed by complex concepts. For example, a teacher of Environmental Science may start with the factors responsible for pollution, before discussing the environmental hazards.

c) Ensuring success experience — rewarding

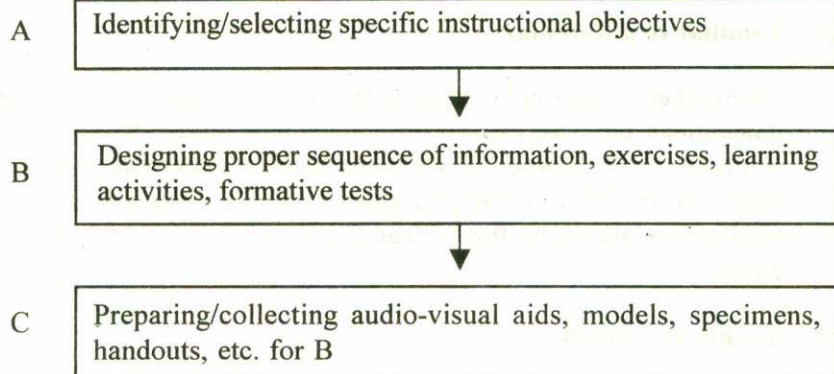
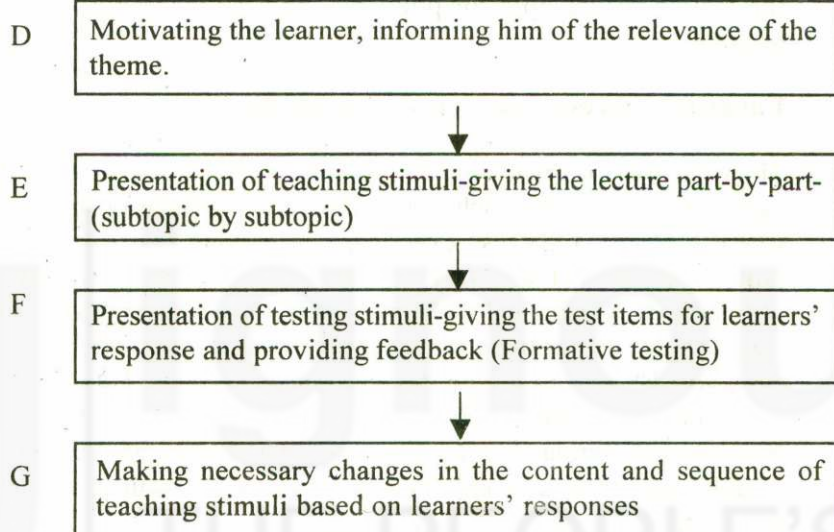
The third way of organising the content is the principle of ensuring success experience. Here, the teacher provides an assignment or exercise to students where they get a success experience in solving that exercise instead of a failure experience. For instance, a Statistics teacher while teaching the concept of the mean, median and mode may start the lesson by giving students some simple tasks on “arithmetic average”. Because most of the students in the class will be able to define the concept of average. This gives a feeling of success to the students. Then the teacher’s next job would be to gradually proceed with similar kinds of success experiences before entering into the complexities of the concept of central tendency as indicated by mean, median and mode.

Similarly depending on the nature of the discipline that you are teaching, and your perception of the subject matter, you might like to restructure the content matter. Restructuring requires skill on the part of the teacher. This can be acquired only through practice. Therefore, to acquire the skill, you may choose smaller content portions and re-sequence them in more than one way and consult at least two other teachers of the same discipline in the matter. Also, you may acquire the skill by reorganizing the content every time you deliver a lecture or teach a particular portion of content and by studying the feedback of students on your mode of content treatment. Students could be the best judge, if their learning is the criterion of your success.

Content organisation — some specific techniques

Let us look at some specific techniques which a teacher can make use of while organising the content matter and activities to be undertaken in the classroom.

- i) Flowcharting:** It is possible to prepare a flowchart of the teaching points in your topic and the task/activities you plan to give to your students. This technique can be used for lesson planning. It is also used to prepare a summary of the type which can be shared with students. Study the following example of a flowchart and prepare similar flowchart for one of your lectures selecting a topic from the discipline that you are teaching.

I Planning before the lecture**II During the lecture session****III Assessment at the end of the session****IV Planning for next lecture****Figure 1 : Flowchart of functions of a lecturer****Source:** Kulkarni (1986).

- ii) **Matrices:** You can prepare matrices of the teaching points of your topic. matrices are two-dimensional charts which show the relationships among the concepts, ideas, events, principles, etc., on two dimensions. The table of specification that you have read in Unit 4 of Block 1 is nothing but an example of a matrix.
- iii) **Content mapping:** This is a technique which you may use to organise your content. Beginning with the central topic or concept or skill or job, you write down all the related ideas, flowing down from your central idea. you will see at a glance how this technique works when you look at Fig. 2.
- iv) **Progressive display of content structures:** Contents can be organised and conveyed very effectively by presenting them in stages, progressively building

up the whole structure as you explain its components. but explaining the content structure (verbally or in written form) may not be meaningful. Instead, diagrams and visual presentations often work better than the spoken or written word in portraying structures. There are different ways of displaying this structuring. One can use an Overhead Projector (OHP) transparency to display the structure as it develops. A structured list or a matrix structure can be progressively uncovered by moving the masks (simple pieces of rectangular opaque material, heavy enough not to bend or blow away). You will know more about OHP transparency in Unit 9 of this Block.

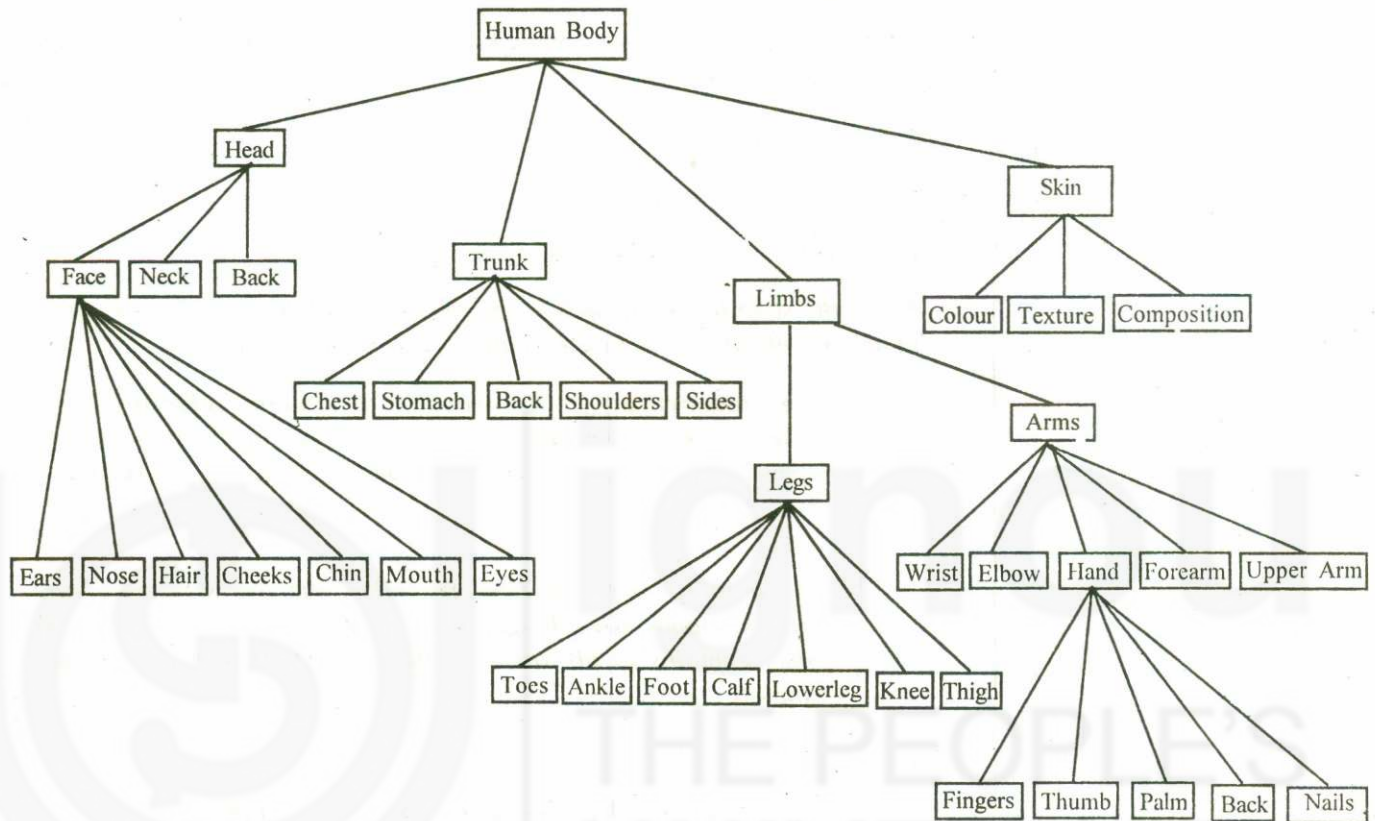


Figure 2: Content map of a human body

Another way of progressive building of structures can be by writing elements into a bare framework. This framework may be given to students in a handout for them to complete. It can be done in the following way.

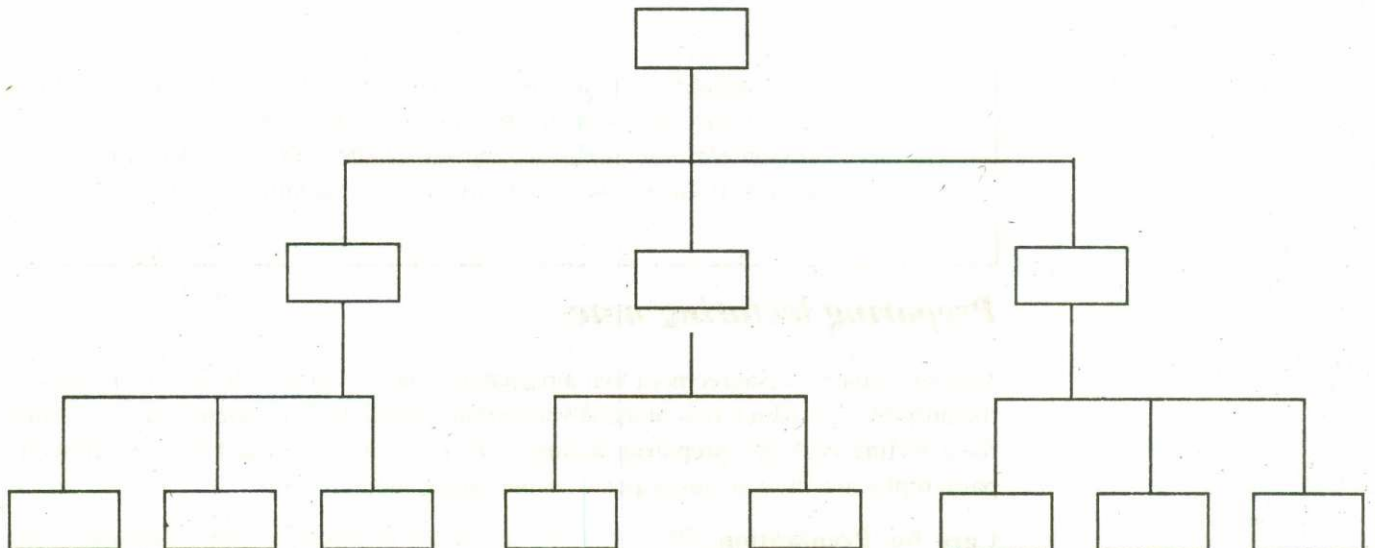


Figure 3: Framework for progressive structure

Such progressive building of structures is valuable when:

- a) the structure is rather complex to take in all at once,
- b) the way the structure develops and the way its components are related need to be shown.
- c) changes over time (in historical developments, the elaboration of a theory, the development of a machine, etc.) are important or can be simulated.

Self-assessment

1. Below are certain situation which follow a particular style of content organisation. The styles are:

- i) From familiar to unfamiliar
- ii) From simple to complex
- ii) Providing success experiences.

Name the style to which each of the following belongs. Write your answer in the blank space provided against each situation.

- a) The teacher gives the example of students electing their classroom representative through secret ballots before explaining to his students the concept of direct democracy...

.....

- b) A Sociology teacher first describes the dress habits, food habits, mannerisms, language, etc., of a particular society and then explains to his students, the concept of 'Culture' of that society.....

.....

- c) A Biology teacher first asks students to name the different organs of the human body and all students answer this. Then he asks them to explain the functions of each organ which is also answered by all students, he then asks them to find out the relationship among the different organs. This is also answered by them. At last, he explains to them the concept of the organic system of human beings.....

.....

- d) A Computer teacher first describes the human brain and how it receives information, processes it and then translates it into action through different organs of the body and then explains to his students the functions of a Computer.....

.....

Preparing lecturing notes

You will have no disagreement that a prepared lecture is more effective in achieving the purposes for which it is being delivered than that which is extempore. Preparing for a lecture includes preparing lecture notes as well. Examined in the following paragraphs are the various aspects of preparing lecture notes.

Care for Preparation: Preparing for a lecture in advance and thoroughly can prevent last-minute headaches. You will need time to arrange the teaching points, select/formulate examples, write definitions, solve equations, draw diagrams and so

on. Some lectures prepare their lecture so much in advance that they have time even to revise them based on student reactions to previous lectures. Some others believe that the best time to prepare a lecture is immediately after the class since what worked and what did not is still fresh in their mind. A general approach is to undertake bulk of the preparatory reading before the commencement of teaching a course to a particular batch and then keep about a couple of weeks ahead of the students.

Avoid Lecturing Verbatim: If you simply read from a prepared text, both you as well as your students will be disengaged from the material. you are disengaged because you are not thinking about the material you are reading and your students are disengaged because it is not personalised to them. reading prevents you from maintaining eye contact with your students, which is essential for fact to-face communication. Even if you are a dynamic reader, when you stick to a script, you would forfeit the expressiveness, animation, and give-and-take spontaneity of simple talking or conversational style. It also casts your voice down towards your notes instead of up and out toward the students of your class. Writing out such lectures is also time consuming and it will not accommodate the realities and differences found in different classroom groups. Hence, it is better to have a brief outline with key words and phrases.

Try Different Formats: Some format of notes are more suited to certain subjects and disciplines than others. If a list of major points is useful to the lecturer who knows the material well, a tree-diagram or a flow-chart showing network of ideas and concepts provides a system of pathways with optional stopovers, useful illustrations or examples.

Prepare Notes to Aid Reading: Cards of about 5" x 8" are more reader friendly than papers. Using cards of different colours would help you classify the content in your lecture/discipline. You may use different inks or position the items in different parts of the card or even box them to indicate to you if an item needs illustration; an item is to be written on the board, an item that need probing students' level of understanding on the subject etc.

Prepare New Examples: A common defect found among experienced faculty who teach the same topic year after year is that they do not even change the examples they use. While some examples are so good that one does not want to change them, there would be many which need replacement with additional reading and reflection. Lest you run the risk of your lecture being typified by your students. Similarly, new illustrations and quotations should replace the previous ones wherever possible. By doing so you would sustain your interest on the topic on which you are lecturing. The following is an example of an outline for a lecture on DNA (source: Scott, 1990)

DNA

OPENING: While you may be familiar with DNA, did you know the story surrounding its structure, the double helix, is one of the greatest detective stories of all time? (Some time could be spent to find what students know).

THESIS: Crick and Watson's discovery of the genetic code radically changed our views about all forms of life.

CONNECTION: If you plan to take other science courses, this topic will be invaluable in helping you understand generics and molecular biology. But even if this is the last science course you will ever take, the DNA in your body will influence your life and life span. The genetic code also holds the key to cures for life-threatening diseases and has ethical ramifications, especially regarding efforts to alter the genes of a human foetus.

ORGANISERS : There are three things I want to discuss

- a) Double helix
- b) Human genomes
- c) The book of life project

BODY: (Elaboration of three topics with opportunities for small group work)

SUMMARY: (Brief recap about each of the three topics and why the discoveries are so important)

CLOSING: Let me close by posing a question. If you could genetically alter a vegetable or piece of fruit, what would be change and why?

Activities during the introductory phase of a lecture

This forms the preparatory/warm up phase of a lecture where you prepare the students to receive the content of the lecture. A variety of activities can be undertaken during this phase. We will discuss here a few activities that can be undertaken.

Checking the entry behaviour

In order to meaningfully assimilate the content of your lecture, students may be required to know certain information or possess certain skills such as entering behaviours. You can check whether they possess this, by asking a few questions, or by posing a problem from the response of which, you can infer the level of knowledge possessed by the students. Some examples of questions that may help the teacher in the following situations to know the level of understanding among the students while teaching the respective topics are. “How do you know about sustainable development?” “Why do you think that the stress fracture occurs?”. The questions may be directed to all corners of the class at random. If satisfied with the check, you may proceed further. If not, a few minutes may be spent on revising the required portions so that students can not listen and meaningfully integrate the information.

Relating the new topic to the topic already taught

Relating the topic that you are going to teach, to the topic taught earlier and also showing its relationship with other branches of knowledge.

Giving an advance organiser

Before starting the lecture per se, you can give a frame so that the students can fit in the information to the frame. Such a frame is called an advance organizer. The principal function of the advance organiser is to bridge the gap between what the learners already know and what they need to know, if they are to successfully learn the task on hand. When new information is introduced to students it is all the more likely to be understood and retained by them if it can be successfully ‘anchored’ to some pre-existing information in the learners’ cognitive structure. This process of linking new information to pre-existing segments of cognitive structure is referred to as subsumption – the particular way in which the content of the new proposition is related to the content of relevant established ideas in cognitive structure. Then the previous information serves to pave the way for the new and makes it easier to learn. For instance, a Geography teacher before going on to describe the river system in India, may provide an advance organiser (comparative) like the following:]

“A river system is just like the blood circulation system of a human being.”

(for more information on advance organiser, see Block 3 of Course-3)

A certain amount of the nervousness is normal especially if the group you are lecturing to is large. Many teachers, with a view to establishing control over the proceedings, would start with a cold and serious voice. By doing so they tend to be unnatural. Instead one could go to the class a little early or talk to the students informally outside the class to establish a rapport with a view to starting one's lecture with an informal voice. An informal voice is also the voice indicative of a confident teacher. Thus, instead of beginning the class on a dull note you would begin it with enthusiasm, thereby arousing an enthusiasm among the learners. If the curiosity of the learners is aroused in the beginning of a lecture to an optimum level, half the battle is won. They will listen to the lecture with enthusiasm and the amount of learning that takes place, in terms of the output specifications of the student's achievement, would be very high.

This can be achieved through various means:

- i) by posing an observation apparently contrary to the common expectation,
- ii) by narrating a real life episode connected to the topic,
- iii) by performing an experiment,
- iv) by recalling students' experiences apparently contrary to theory,
- v) by producing an evidence which questions the previous understanding of an epoch, a practice, a phenomenon etc., and
- vi) by posing a composite problem based on the previous knowledge of the students which requires further information for them to solve it and will be provided in your lecture.

The points (i) to (vi) are only a few ways of arousing the interest of students. There could be many more ways of arousing the interest of your students.

It is rather desirable that you tell your students what you expect to accomplish during the class, or list the objectives of your lecture on one side of the board. This would not only be an organizer for the students, but also for you to monitor your progress. Effort would normally be made during this phase of a lecture to link what is being presented to what has already been taught or what students already know.

These are a few of the activities that can be undertaken during the introductory phase of a lecture. All the suggested activities may not find relevance to all the lectures that you are delivering. Depending on the time, nature of the topic and your previous experience, a few activities in combination could be undertaken.

Self-assessment

2. Below are mentioned some activities done by the teachers during introductory phase. Mention the skill to which each activity belongs. The skills are:

- i) checking the entry behaviour
- ii) relating the topic to the topic already taught
- iii) giving an advance organiser
- iv) arousing interest and motivating the student.
 - a) A Science teacher puts the same quantity of water in two beakers of different structures and asks students to say which beaker contains more water. Students say, beaker 'A' contains

more water than beaker 'B'. From this observation of the students, the teacher brings them to the concept of volume underlying the event.

- b) A History teacher before starting the topic on Shah Jehan establishes a linkage of the topic with the topic on Jehangir.*
- c) A teacher at a T.V. training institute asks a fresher, who has come to learn T.V. mechanism a few questions on radio mechanism.*
- d) An Economics teacher in the introductory phase of a lesson asks students a few questions on exchange of goods between/amongst persons and then writes on the blackboard:*

"The barter system is exchange of goods and services between individuals!"

Activities that can be undertaken during the development phase

Following the preparatory phase, you enter the development phase, which takes the largest portion of time among all the phases. Some of the activities that can be undertaken during this phase are given below.

Using analogies

Analogies are used to a great extent during lecturing, especially when one has to explain a complicated process or a complex concept e.g., in order to explain the expansion of universe based on the "Big Bang" theory one may resort to the expansion of a cake in an oven as an analogy. Certainly analogies reduce the complexity and so make it more assimilable for the students, but it runs the risk of creating false concepts or misconceptions. The extrapolation of the meaning of the analogy beyond limits often creates this confusion. The lecturer who plans to use the analogy may not intend this extrapolation, but he cannot prevent the learners from developing such misconceptions. The same is true of the above cited example of the cake. In order to develop the skill of using analogies do the following:

- i) Deliberately plan an analogy during one of your regular lectures and after the delivery of the lecture, call at random a few students and try to know their understanding of the concept.
- ii) During this discussion, make a deliberate attempt to stretch the meaning of the analogy beyond the expected limits (like the shape of the dough before baking — in the previous example).
- iii) Observe the reactions of the students from which you can infer the depth of the misconception
- iv) During your next lecture, plan an analogy and during the delivery, explain the precautions of stretching the meaning of the analogy beyond limits.
- v) Repeat the exercise of having a post lecture discussion to study the misconceptions, if any.

A couple of such rounds of practice would certainly improve your skill of using analogies.

Use of illustrations

Illustrations form an integral part of any lecture. They are very effective in explaining the point being talked about through examples, events, specific situations, etc. The

precaution to be borne in mind is regarding the over use of it. It often happens while illustrating, that both the listeners and the lecturer are carried away by the details to the illustration which are not relevant to the topic being delivered, thereby sometimes even forgetting the subject matter. The teacher may make deliberate attempts to avoid this by bringing back the attention of the students to the relevant portions of the illustration or by integrating the illustration to the theme of the talk.

Explaining with aids

To achieve a wide variety of stimulus variations in the class, oral explanations have to be supplemented with a variety of teaching aids ranging from the chalkboard to computers. The choice of the aid and its proper utilization depends on the skill you possess. The skill can be acquired only through practice. Such practice may be made a part of your regular teaching. You will be learning more about the skills of using communication aids in Unit 9 of this Block.. If you can find a like minded and co-operating colleague, this activity can be made more effective by mutually observing the delivery of a planned lecture and exchanging comments for improvement based on which changes could be made on subsequent lectures.

These are some of the activities that can be undertaken during the development phase of a lecture. Depending on the way you want to organise the content and treat it, you may even include a task in between for the students to accomplish and then proceed with the lecture after deriving the relevant portions from the results of the tasks (an illustration of the 'task' mentioned here is given in Unit 2, Block-1 of this course),

Convey your own enthusiasm for the material

Keep revisiting the factors that inspired you to study the subject in particular or what you did not get inspired by. It is necessary to convey your enthusiasm about the subject to your students as well.

Be conversational

Use conversational style in your lecture, varying the tone and pitch just as you do in normal conversation. If you focus on the meaning of what you are saying, you'll instinctively become more expressive.

Use techniques to sustain student attention

Seeking and sustaining student attention is among the most important requirements to make them learn. Studies have shown that most students become inattentive after about ten minutes of passive listening. You may try one or more of the following techniques to sustain the attention of your students.

- *Ask questions at strategic points or ask for comments or opinions about the subject.*
- *Play devil's advocate or invite students to challenge your point of view*
- *Have students solve a problem individually, or have them break into pairs or small four-person groups to answer a question or discuss a topic*
- *Introduce visual aids: slides, charts, graphs, videotapes, and films wherever possible.*

Activities that can be undertaken during the consolidation phase

An abrupt end to a lecture would reduce its effectiveness to a great extent. Hence the end phase of a lecture should also be planned. Some of the activities undertaken during this phase are:

Reviewing or summarising

On completion of the development phase of a lecture, the teacher can give a brief summary of all the teaching points that have been covered in the lecture. This would enable the students to recapitulate the points and integrate them. The points could even be summarized on the chalkboard, so that students could take them down as a record.

Establish achievement of goals

Help students see that a purpose has been served and that something has been achieved during the last hour or so. A well planned conclusion not only ties up loose ends but also suggests ways for students to follow-up on the lecture.

Checking the achievement of output specifications

The teacher can evaluate the effectiveness of his lecture through asking questions that reveal the achievement of the specified outputs. The mode of presenting the questions could depend on the resources available. One may ask the questions orally at random to the various corners of a class (these questions form a representative sample of output specifications set before the delivery of the lecture). One may give multiple copies of an objective type test of the students to answer. Or one may present the items through a hardware, asking students to answer. (You will learn more about items and evaluation techniques in Blocks 3 and 4.) The important point to remember here is that, it is desirable to give an immediate feedback to the students on the status of their achievement. This can be done by asking students to check their answers with the correct key, or interchange the answer sheets where one student scores a peer's answer sheet. This immediate feedback enhances the learning to a great extent.

Giving assignments

Assignments integrating the various teaching points of the lecture would help students use the acquired knowledge during the lecture thereby enhancing their understanding. The assignments could be in the form of tasks, exercises or composite problems. Depending on the time required to complete the assignment and the time at your disposal, the assignment could be a class assignment or a take-home assignment. In both cases, getting a feedback from the students and reinforcing their responses becomes very important for effective learning.

Relating the topic to future learning

Yet another meaningful activity during the concluding phase of a lecture could be the linking of the topic to those which the students are going to learn in the immediate future.

Finish forcefully

Do not allow your lecture to trail off or end abruptly or in a low tone. Let your voice be strong and eyes facing the audience. End with a thought provoking question or problem; a quotation; an issue or a major conclusion.

These are some of the activities that could be undertaken during the concluding phase of a lecture. Depending on the necessity, one or a combination of the above mentioned activities can be undertaken. The above list is not a comprehensive one and therefore teachers may use other meaningful activities too.

Self-assessment

3. Match the teachers' activities in List 'A' with the skills associated with these activities in List 'B'. Each skill can be used more than once or not at all.

List A

List B

- | | |
|--|---|
| i) A Biology teacher compares the human body system with a machine. | a) Use of illustrations |
| ii) A teacher gives a quiz test at the end of his lecture. | b) Summarising |
| iii) A teacher recapitulates whatever he has covered in his lecture, at the end of the class | c) Explaining with teaching aids |
| iv) A History teacher uses maps, posters, charts, graphs etc., in his teaching. | d) Giving assignments |
| v) A teacher of Environmental Science talks to his students about the bad effects of industrialisation, to explain the concept of environmental hazards. | e) Using analogy. |
| vi) A Statistics teacher gives the students five problems on Chi-square, which they are to complete before the next class. | f) Checking the achievement of output specifications. |
| vii) A teacher uses an OHP while teaching in a class. | |

Skills associated with the delivery of a lecture

To conduct the activities mentioned above in a meaningful manner, a lecturer requires skills in imparting them. One can acquire these skills only through practice. Along with these skills a lot more general skills are required for delivering a lecture. Some of these skills are discussed below.

Maintain eye and ear contact

Focus on your students as if you were talking to a small group. One-to-one eye contact will increase students' attentiveness and help you observe their facial expressions and physical movements for signs that you are speaking too slowly or too quickly, or need to provide an explanation or an example. Similarly, maintaining ear contact is to be able to listen to the sounds made by the students. Especially when students are not sure about the correctness of their answer, a lecturer who maintains ear contact with the class is able to hear the murmured answer of a student. A common mistake that lecturers make is to become so absorbed in the material that they fail to notice whether students are paying attention or not.

A moving object is more compelling than static one. Occasionally, move about the room as you lecture. Movement also enables a lecturer to vary the distance between self and a student. Moving towards a student (proximity) shows an interest in the student and hence is useful in encouraging a student who is answering to a question. Moving away indicates a disinterest. Proximity could also be used for controlling an undesirable behavior in one or a group of students from developing into a larger problem of classroom management.

Use of body language

A stiff and poker faced teacher will be able to achieve only fewer output specifications in his students, than one who uses his arms, eyes, facial muscles, etc., to convey ideas and feelings. Conveying ideas and feelings through the use of gestures, hands, eyes, etc., is called body language. While executing any activity related to the lecture, body language can be used to a great extent. But, overdoing it may distract the attention of the students. An example of body language in terms of using the hands is hitting one palm against the other in the form of a chop, in order to emphasize a point during the delivery of your lecture. Similarly, this could also be used for extra instructional purposes. For example, when you spot a trouble maker in the last row of a class of 100, you need to communicate to him that he has been spotted by you. At the same time, you do not want the whole class to know about it for fear that it would come in the way of the smooth delivery of the lecture.

Incorporate anecdotes and stories into your lecture

When you are in a narrative or story telling mode, your voice becomes conversational and your face more expressive, and students tend to listen more closely. Use anecdotes to illustrate your key points/issues.

Use of Communication boosters

In addition to the body language one can use a variety of other activities to boost communication, like humour, visual aids like photographs and cartoons, and thought-provoking questions. Inviting probable hypotheses on a problem that has emerged could also act as a communication booster because it focuses the attention of the students and demands cognitive participation. Communication boosters become essential for various reasons. These are:

- i) to break the monotony of the teacher talk,
- ii) to sustain the attention span of students which, on an average, is well below the time allotted for the lecture,
- iii) to maintain the interest aroused at the beginning of the lecture, and
- iv) to improve the effectiveness of the delivery, in terms of students achieving the output specifications.

Varying the stimulus

The purpose of varying the stimulus is more or less similar to that of including communication boosters in your lecture. Though teacher talk is the predominant stimulus by using body language, communication boosters and a variety of teaching aids including the presenting of the stimulus through hardware. The shift from one stimulus to another smoothly during the delivery of a single lecture, is a skill. It needs deliberate planning and practice on the teacher's part to sharpen his skills. This can be incorporated into your regular teaching by making deliberate attempts to plan a variety of activities and getting the students' feedback on the appeal of the various stimuli to them, and their effectiveness from the point of view of the learners.

Voice modulation : It is one of the simpler ways of stimulus variation, but this too should be appropriately used. Talking for a long time at the same pace and in the same pitch can have a soporific effect on the listeners. Varying the pace of speech and the pitch and the loudness can bring in a variety by which the attention of the students would be better maintained. Talking at a fast pace with a shrill voice can be demotivating for the students. This is more likely to happen when your anxiety level is high. You may start a lecture at a slow pace and with a base voice, and as you proceed, you get more involved in the content of the lecture, and your pace and pitch also change. Only a deliberate attempt made by you will help you get over monotony in your speech.

Laugh at yourself when you make a mistake

If you mispronounce a word or drop your notes or wrongly use a word or forget a technical term, your ability to see the humour in that situation and to laugh at yourself for the error or omission committed will put everyone at ease. Don't let your confidence be shaken by minor mistakes.

Vary the pace at which you speak

Students need time to assimilate new information and to take notes during your lecture. If you speak too slowly they may become bored and if you speak too fast they find it difficult to catch up with you. While maintaining a speed appropriate to your students, you must be able to vary the pace contextually. The same would apply to your questioning behaviour as well. Further, you should try to watch your breathing during speech. If you breathe normally, the vocal strain would be avoided and the pitch of your voice would be appropriate. Try keeping your shoulders relaxed, neck loose, eyes fully open and your jaw relaxed.

Prepare yourself emotionally for the class

Some lecturers spend their time immediately before proceeding to the class in solitude, reviewing their notes, whereas some others may just do anything before the class but review the notes. Some even do not stop to wish a passing colleague or student whereas the others relax by speaking a few words to any one available at hand. Try to identify for yourself an activity that gives you the energy and focus you need to speak enthusiastically and confidently.

Questioning skills

Questions is a powerful technique of classroom instruction. Through this technique, the teacher transacts a lot of learning experience. The teacher asks question and use responses given by the students are strengthened and elaborated. According to Lorber and Pierce (1990), questions can be used to find out how well students understand a particular block of information, to shift student's attention from one point to another, to increase retention of important points by isolating and emphasizing them, and to put students in the right direction before starting assignments. Questioning facilitates high order thinking skills like analysis, synthesis and evaluation in the students. In order to increase the effectiveness of questions you may take the following steps:

- i) **State the question clearly and precisely:** A question must be clear and precise. There should not be any ambiguity in the question. For example, a question like "what about Buddhism?" does not convey any meaning to the students. It would be better to ask "How does Buddhism differ from Jainism?"
- ii) **Pause after asking the question and allow it to "hang overhead":** The teacher should ask the question clearly and then pause before calling on someone to respond. This helps students to think about their answer.

- iii) **Call on students at random:** While calling on students, the teacher should not follow any specific pattern such as seating arrangement, alphabetical arrangement, etc. Rather, he should call on students at random.
- iv) **Provide immediate feedback to students:** The teacher should give immediate feedback after receiving students' responses. He should tell the students if the response is partially correct or wholly correct.

Questions can be classified in various ways. One way is to categorize questioning according to Blooms' Taxonomy of Educational Objectives.

- i) **Knowledge (or simple recall):** "What are the salient features of India Constitution?"
- ii) **Comprehension (or understanding):** "What do you mean by a volcano?"
- iii) **Application (using information):** "What would be the time in Paris when the time in New Delhi is 12 noon?"
- iv) **Analysis (or pulling a idea apart):** "What is the impact of the British rule on independent India?"
- v) **Synthesis (putting together something new):** "How would you have improved upon Germany's strategy during the Battle of Britain?"
- vi) **Evaluation (making and defending a judgment):** "Do you favour the parliamentary form of government, and why?"

Questions could also be categorized according to their essential functions:

1. **Probing questions:** Probing questions are meant for motivating students to go beyond their initial responses and help themselves in solving the problem. For example, to a response, like "Barter economy means exchange of goods for goods." The teacher may say "Good" and ask the student to provide an example of "barter economy".
2. **Open-ended questions:** These questions have definite right or wrong answer. Students are free to think on their own and provide answers with a logic. A question like "What will happen to the Island country of Maldives if the temperature on the earth increases?" may be asked of the students.
3. **Convergent questions:** Convergent questions are designed to "converge" on a particular idea or point and are meant for inducing a principle or deducing an answer. An example of a convergent question is "How do farm subsidies affect consumer prices?"
4. **Divergent questions:** Divergent questions are helpful to draw a student's attention away from one point and allow it creative freedom to settle on a different but related point. "What present day parallels do we have, if any, to the Indus Valley Civilization?" is a divergent question which inspires students to think divergently on two analogous situations.

Pitfalls associated with lecturing

Thus far we have discussed at length what factors would contribute towards enhancing the effectiveness of your lecturing. However, the discussion may not be complete without a mention of the common errors and pitfalls committed by unskilled lecturers which render their lecture ineffective. Some of them are presented in the following with a suggestion that a lecturer may try and avoid them to the extent possible.

Trying to cover too much material

A lecturer is not a replacement to a textbook or reference book. One who wants to speak out every detail of a content matter is not only trying to do too much in too little a time, but also makes the presentation informative rather than thought provoking. As a result, the students in a college class, which normally is a heterogeneous group, fail to comprehend much of the content as they find the presentation too fast in pace and loose interest in it. Trying to "Cover the syllabus" or the book is an improper stance for a lecture.

Failing to prepare

Most teachers at the higher education level have spent enough time and effort on learning the content which they ought to teach. They are hence very well informed about the subject they teach. But, being an expert in a discipline does not necessarily ensure that one can teach it to others effectively. Lest, every gold medallist in a discipline should also have been the best teacher in that discipline. Which you know is not the case. There cannot be any replacement to preparation for a lecture.

Student perception is equally important

Even if a lecturer is well organized as perceived by self, it is important to know whether the students perceive the lecture as organised. Researches have shown that listeners tend to perceive speakers as less organized if:

- They cannot identify the main idea
- No summaries are provided
- Transitions from one teaching point to the other are weak or non existent
- The organizational structure is too complex to follow.

Encouraging student passivity

Most students attending a lecture perceive that their role is one of passive listener. Especially in a large class, they may think that it is perfectly alright to sit back, relax and take a few notes. An instructor who thinks similarly about the role of the students is encouraging passivity among the students. Learning, on the other hand demands that the students are active and participate in a lecture.

Ignoring student feedback

A lecturer who is too preoccupied with the items to be covered in his lecture is less likely to notice the feedback the students provide. This is largely linked to the "covering the syllabus" syndrome of a teacher at higher education level. Much of student boredom, frustration and confusion is communicated non verbally to a teacher. Unless a teacher is keen on observing the student behaviour, she may communicate a lack of concern for the students and thereby loose them for the rest of the class.

Failing to concretize abstract material

Much of the knowledge in a discipline is abstract unless made concrete by a teacher. Learners often find it difficult to relate continuously to abstract material. A teacher needs to concretize such material deliberately by illustrating, translating verbal content into visual material, by providing personal analogies, or by putting the learners on specific tasks/activities. However, teachers do operate at the abstract/symbolic level and make it difficult for the students to benefit from such lectures.

Distracting mannerisms of a lecturer

Whenever students are attracted to the style and mannerisms of a lecturer rather than the contents of the lecture, it is likely that the students do not benefit due to a lack of attention. Students who spend their time in a lecture counting the number of times their teacher says “you know” or “do you follow”, or are amused by the frequent actions or a typical body movements of a lecturer are not learning very much in the class. If you wish to know whether you have one such pitfall, ask your students to imitate you. It is difficult to imitate a person who does not have idiosyncrasies or atypical behaviours.

Summary

In this Unit, our main thrust of discussion was on various skills which a teacher uses at different phases of a lecture. We started the Unit with how contents are organised before the start of a lecture. In this context, we talked about some parameters which may be taken into consideration while organising content and also mentioned some specific techniques which may be used in content organisation. But the main body of the Unit was the skills used by a teacher at introductory, development and consolidation phases of the lecture. Apart from the skills used by a teacher during these three phases, we also discussed the skills used by a teacher throughout the delivery of a lecture and the pitfalls associated with lecturing.

Unit-end activities

1. Choose a particular topic, from your discipline, which you propose to teach and organise the content matter with the help of both a flow-chart and a content map.
2. While delivering lectures to your students, you must be using certain skills. Make a list of all those skills. Categorise them according to the delivery skills mentioned below:
 - a) Use of body language
 - b) Use of communication boosters
 - c) Varying the stimulus
 - d) Questioning skills

Points for discussion

1. Although a lecture method has many defects in terms of effectiveness, it is still used by many of us. Why is it so? What are the new ways of overcoming the limitations of lecture?
2. What is the difference between public speaking-oratory before a large group of audience and a classroom lecture?

Suggested readings

Jangira, N.K. (1963). *Technology of Classroom Questioning*. New Delhi: National Publishing House.

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

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

Answers to self-assessment

1. a) familiar to unfamiliar
b) simple to complex
c) providing success experiences
d) familiar to unfamiliar
2. a) arousing interest and motivating the students
b) relating the topic to the topic already taught
c) checking the entry behaviour
d) giving an advance organiser

- | 3. List A | List B |
|-----------|--------|
| i) | e |
| ii) | f |
| iii) | b |
| iv) | c |
| v) | a |
| vi) | d |
| vii) | c |

8

Skills Associated with the Conduct of Interaction Sessions

Introduction

You have studied in the previous unit what constitutes an efficient and skillful organisation of the most used technique of communication at the higher education level, namely, lecturing. In this unit, you will be exposed to the skillful organisation of an input alternative, namely group interaction session. In conventional lecturing, 'the interaction flows from the teacher to the learners in an unidirectional manner. In a group interaction session, every member of the group, whether teacher or learner, has scope to interact with each other. You have already seen in Unit 3 of Block 1 that the term 'group interaction session' or briefly, 'interaction session, is an umbrella term covering several types of interaction session such as, group discussion, seminars, buzz sessions and brainstorming sessions, and even though they differ from one another in terms of the intended achievement, they are common in the fact that overt verbal interaction among members of the group is a must for all of them. Like a lecture, it can be good or bad, depending upon the skill of a teacher. A group interaction session also requires a skillful display on the part of the teacher in its organisation and conduct if it has to achieve the objectives for which it is organised. Otherwise, the interaction may become a counter productive chaos rather than a purposeful communication among learners.

Learning outcomes

The purpose of this unit is to give you an overall view of the different phases of organising group interaction sessions and related issues. This is done with specific references to skills and considerations for efficient organisation to enable you to acquire the necessary knowledge to effectively use group interaction sessions as input alternatives for instruction at the higher education level. When you have completed this unit, you will be able to:

- identify elements of an interaction session;
- list the tasks undertaken in an interaction session;
- describe and rate components of arranging an interaction session;
- state what is meant by a Chairperson;
- identify different roles of a Chairperson and describe the component skills and considerations in each role;
- explain how follow-up of an interaction session is done';
- describe an appropriate seating plan and furniture infrastructure for interaction in classroom; and
- describe the norms conducive for interaction in a group.

Nature and importance of an interaction session

Learning, according to the constructivists school of thought, is a socially constructed and interactive process whose acquisition is facilitated by interaction with others. Interactions are useful to explore material, to share new examples from diverse backgrounds, to examine and defend ideas, and to enlist the aid of colleagues in the development of ideas.

The constructivists would like to see student-student dialogue which makes visible the processes of analyzing, interpreting, predicting and synthesizing. These processes are shared and reflected upon in the process of discussion between peers. They can reflect on their own discourse history and interpret what others have said in their own context. They can present their own points of view interactively with others. They can, through dialogue, present ideas that support their perspectives and see the arguments and counter arguments of others. Interaction forum provides an opportunity for the development of scholarly arguments, which is well articulated. Learners can ask questions and share ideas at the time of the discussion. Interaction groups typically develop a sense of community of sharing and jointly participating toward a common goal.

Typically we think of interactions as focusing on cognitive topics and cognitive acquisition of information. Interaction sessions have another objective which is equally important, some say more important in some disciplines. This is the development of affective qualities that assist in the development and or control of feelings. Whenever a learner has a new experience it is categorized as positive, neutral or negative. Generally, we would like instructional experiences to be positive but students do not always view them in this light. The interactive discussion, either synchronous or asynchronous can be used to address this problem. Students need to express their feelings to see if others have also a similar feeling. This can be accomplished during discussion. Peers can share their experiences, feelings and expectations. They can receive support and reinforcement from each other. For those who need support and wish to share feelings and experiences the interaction session is a primary vehicle in assisting in their development.

You already know that in a lecture the group is being addressed to by a person who usually is more informed about the topic of lecture. Hence, a lecture session consists of a teacher (lecture) and several learners (listeners). Whereas, in an interaction session the '**Chairperson**', who is chosen to preside over the session, is ascribed the duty of conducting the proceedings by occupying the chair. He does not have to be a teacher or an expert subject matter specialist. The other element in many interaction sessions is the '**speaker**' who presents a studied paper on a pre-decided topic. Such a speaker again need not necessarily be a teacher or leader in the conventional sense. All the members of a group interaction session are called '**participants**' since they are expected to participate in the discussions, and also actively express their views not be just passive listeners. Depending upon the context and need, a particular participant may undertake the task of systematic observation of interactions, or of recording the proceedings of the session. This is done mostly on request of the Chairperson and the requested '**observer**' or '**recorder**' refrains from taking part in the proceedings of the sessions. The participants of an interaction session may interact as one group on an equal footing as is done in a seminar, or they may be divided into smaller groups as in brainstorming.

Tasks undertaken in a interaction session

To an untrained eye, most interaction groups may look like discussion groups- doing their work by holding talks. Some groups have distinguishably different aims from those of simple discussion groups. On the basis of the aims of organising an interaction session we may broadly arrive at the following classification of the tasks undertaken by an interacting group.

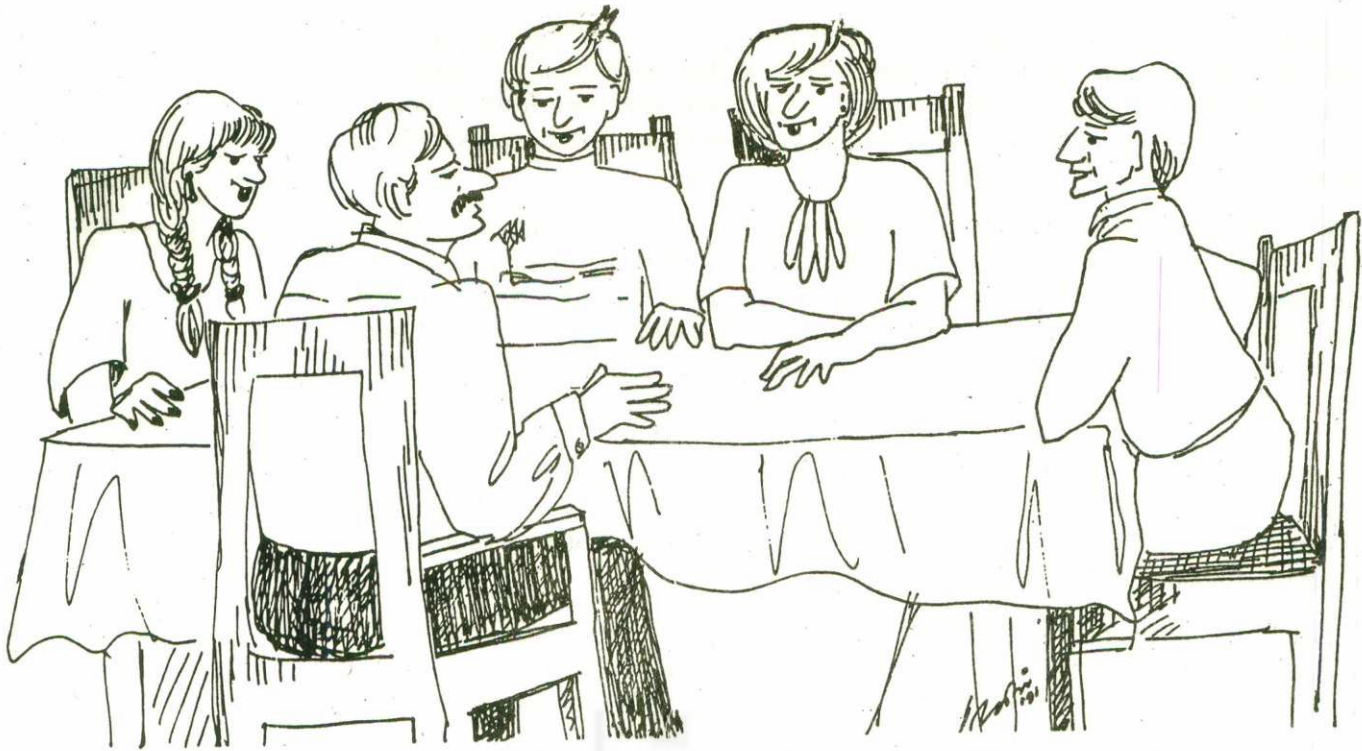


Figure 1 A discussion session

- i) **Discussion:** Most groups spend a fair amount of time in finding out each others ideas and opinions. Discussion sessions are organised with the predominant purpose of providing a platform for sharing and clarifying ideas, opinions, and information. The major preoccupation of a Chairperson in a discussion group would be to facilitate smooth and purposeful transactions of participants, ideas, opinions and information.
- ii) **Problem-solving:** At times, interaction sessions are organised with a view to enabling the participants to organise information in new configurations, relevant to the solution of a specified problem. A number of specific techniques are developed to enable a group to undertake the task of problem solving. The one that you have studied earlier is “brainstorming”, in which the group members are encouraged to produce as many thoughts and ideas as they can, in a set time, without criticizing or commenting upon their own or others’ contributions.
- iii) **Negotiation:** Negotiation groups are, by definition, groups set up when more than one solution to a problem is available and when these solutions are in conflict. The interaction process is one of ‘settlement of differences and resolving of conflict through verbal exchange’. Since a lot of difference of opinion could be generated during the process of settlement, in these groups, the Chairperson is generally (but not necessarily) selected for his/her neutrality and capacity to mediate.
- iv) **Decision-making:** you may think that groups which are involved in solving problems or negotiating, are, in some sense, also making decisions. Well, they are deciding what the answer is or where the acceptable compromise lies. However, these groups can often be faced with problems where there is no immediate available answer and where, there are no particular vested interests to be satisfied. In these circumstances, the group as a whole is being asked to make a judgement. Such judgement can be value judgements as to what “ought to be”, and more frequently, they are judgements based on inadequate data or untestable assumptions about future events. Management planning sessions are often of this kind.

Self-assessment

1. *What is the importance of group interaction session?*
2. *Name the elements of a group interaction session in terms of the roles played by members.*
3. *List the main purpose behind the undertaking of the following tasks in an interaction session:*
 - *Discussion;*
 - *Problem Solving;*
 - *Decision-making;*

Types of discussion

Discussion among members of an interacting group is primary to any interaction session. The discussions could be of the following types depending on who controls it.

- **Teacher Controlled Discussion:** This is a discussion in which the teacher has control. The teacher poses questions, requests responses, summarizes the discussion, and determines its direction.
- **Collaborative Discussion:** This discussion provided opportunity for a group to interact collaboratively. This is a collaborative, rather than a teacher driven process. Students control the objectives and goals of the discussion and set the rules for how interaction proceeds.
- **Student Run Discussion:** In many settings students can run discussion sessions. Typically these will be of the synchronous variety. The student is the subject matter expert and has read in depth in the area of the discussion. Other students have read some information, from a text or article, but have not delved into the material in depth. The student discussion leader proceeds and the teacher remains in the background. It may be noted that the students led discussions do not usually generate as much confrontation and hostility as teacher led discussions when the topics are highly controversial.

Formats for Group Discussion

Depending upon their purpose, group discussions can be organised in different formats. Some of the formats for organising a group discussion is given below:

Critique: The critique is a one-on-one procedure where the teacher discusses a topic with an individual student to assess the student's strengths and weaknesses and the teacher suggests improvements. Typically this is like the discussion that a teacher would have with a student in a conference, office hours, or during a thesis meeting. A group technique, which follows the same model, is the hot seat. While on the hot seat all questions, both peer and teacher derived are directed to one student. That student must attempt to answer all of the questions and function as the expert for some period of time. The Socratic dialogue is another similar technique for single students. In the Socratic dialogue the teacher tries to lead the student to an answer by asking a series of focusing questions which try to draw the answer out of the student (the assumption being that the student knows how to answer the question if he/she is just stimulated to think about his/her knowing in the correct way)

Circle: In a somewhat different approach you can go around the circle. Here each participant is asked to respond to a question or problem in turn following a class

roster or other list of students. This is obviously an activity in which learners know when they will be called on. As in face-to-face classes this technique leads to a lack of focus on the discussion unless the learner is highly interested in the content. A similar format is twenty questions. Here the teacher poses questions to the student or the group and they respond. Another discussion procedure is blind man's bluff. Here the teacher poses a misleading statement and asks the students to process it and try to integrate it into their cognitive structure.

Poll: Another discussion format, which is used in some classes to collect data, is the poll. Students are asked to provide information about something that they know about. The data are tallied and are then used by the class in some way. This could be done in Political Science, Sociology, Psychology, Physiology, Geography, and so forth.

Think-pair-share: The approach used is a Thin-pair-Share process in which students think on the given topic, form pairs for interaction and share ideas. Directions for pair's discussion activity are provided by the teacher and they could be as follow according to Bull, (1998).

- Read the content of the write-up that has been provided to you.
- Note what you think are the important ideas
- Create sharable examples of how you could use the content
- Find a partner and share the ideas
- Discuss other ideas which would be appropriate
- Develop a list of thinks you would suggest to share with others in the group.

When both sides of the issue have been articulated the pair develops a graphic organizer to evaluate the information and to categorize it. Then through further evaluation a conclusion is reached as to which side is most supportable.

Idea circles as a form of discussion: Idea circles are small group discussions that are developed and led by peers. The discussions usually come about as a way of integrating information from multiple sources that individuals have brought to the discussion or which is an outgrowth of research in the library or on the internet. Students collaborate to create new abstract understandings from related facts, ideas, processes derived from a variety of sources. Teachers can start idea circles or students depending on whom has ownership of the project.

Inquiry oriented discussions: This type of a discussion is used to explore text or other material that is brought to the group by an individual, many times the teacher. An inquiry discussion is focused on exploring a particular text or other resource. Students look for similarities or differences between this new material and material which has already been learned or explored in other contexts. Some evaluation is necessary to determine if the new information is congruent with the old. This is a constructivist process that causes changes in schemata and in the way particular information is approached.

Reading between the lines: This kind of a discussion asks the student to go beyond the literal level. The students collaboratively reflect on the text and try to determine the implicit meaning and assumptions of the author in the development of the text. This process helps learners critically evaluate text by looking at assumptions, missing information and hidden agendas.

Arranging an interaction session

The activity of arranging an interaction session is undertaken before the actual conduct of the session. It can be compared with the need on the part of a director

to arrange the stage and characters before the actual commencement of a play. For the purpose of analysis, the arranging of a session can be seen as consisting of five sub-activities, viz., identifying themes, motivating, notification, circulating, write-ups, and planning and strategy.

Identifying themes

Any instruction, as you are aware, aims to achieve certain objectives. Input alternatives differ in their strength for achieving different instructional objectives. Group interaction sessions are more suitable for the achievement of higher cognitive objectives and the development of certain affect attributes among participants. Having formulated the instructional objectives for a course, you would be able to know which content areas are suitable for developing cognitive abilities like application, analysis, synthesis, evaluation, problem-solving, and decision-making. Also, you would know the content areas appropriate for developing social interaction skills and attitudes. In other words, the instructional objectives constitute the major source for identification of themes for organizing interaction sessions.

Depending upon the subject being taught, you would be aware of a few outstanding issues and controversies. These issues and controversies, which usually require a stand to be taken, are also suitable for group interaction.

Whatever be the reasons, in most interaction sessions the discussions are either not complete, or there are areas which are left uncovered. Interaction sessions leave aside topics which are allied to the discussion or which are outside the purview of a given session. These may be topics which emerge during the course of discussion, but which are not discussed at length, may have attracted the attention of participants. They can be taken up in a separate session depending upon the interest shown by participants and their suitability in terms of the instructional objectives of the course.

Motivating

Normally college students do very much like to interact with other students and participate in discussions if they are not afraid of their performance being observed and ridiculed or of being punished for their weaknesses. It is this fear of ridicule (or some other form of punishment) which prevents them from participating and expressing their views. So the first requirement of any interaction session is to encourage students to get over this fear. At the same time an interaction session in a classroom is not like gossiping in a street corner. There has to be some instructional objectives on which the session should be structured.

Such structuring can be done in any one or a combination of the ways described below:

- i) By announcing the theme of the discussion and its objectives much in advance so that the participants can prepare for it (gather their thoughts, collect data, etc.)
- ii) By requesting one or more of the participants to prepare a paper/note which can be presented before the start of the discussion.
- iii) By the teacher or Chairperson presenting two or more conflicting opinions, and several sets of data for the participants to ponder over before starting the discussion, to elicit their views and opinions.
- iv) By bringing up a problem for discussion which one of the participants has faced or has brought out and it needs to find a suitable solution.

In other words, involve the participants, and get them to think/feel for the topic before the discussion starts. The involvement and thereby the motivation thus increases when the discussion allows each participant to share his/her views and feelings without the fear of being judged wrongly.

In every institution and for all courses, it may not be possible to make paper presentations compulsory. Having seen student groups at the higher education level, you would know that it is not very difficult to find at least a few enthusiasts for an academic activity. Identifying such students presupposes a closer relationship and understanding of the student group of which you are the teacher.

Many a time, especially in undergraduate classes, one finds, students who are capable but hesitant to face a group. Such an inhibition is probably in keeping with the psychological characteristics of students of that age and may be more prevalent among co-educational groups where students of both sexes study together. This may be easily compared to what is commonly known as '**stage fear**'. This could possibly be tackled by giving short assignments before the session, like finding an answer to a question to be read out in class. Such questions can also come from the students, which are raised during a lecture. Simultaneously, informal sessions can be planned to boost the morale of the inhibited student.

Sometimes, one may not be aware as to how to go about preparing a paper, due to lack of proper study habits. Such students need frequent guidance during the course of their developing a paper. Such guidance sessions would also help you ascertain whether the student is proceeding on the right lines towards fulfilling the instructional requirements of the interaction session. While assigning a topic or eliciting it from the student, you may be able to make the task acceptable to him if you have made some assessment of his interests. The more one is interested in a topic, the more inclined one will be to undertake a serious study of it.

Notification

Is it necessary to consider notification as an activity in arranging an interaction session? There are hardly any teachers who notify a lecture session. A lecture is too conventional a method to be notified to students. Normally, students expect a teacher to deliver a lecture immediately on entering the classroom. Group interaction sessions are not yet conventional in higher education and the organisation of these requires that they be intimated in advance to the participants.

Advance intimation of the date, time and venue would not only help a speaker to get the paper ready but also get '**psychologically set**' for the occasion. Psychological set is found to influence the performance of a speaker in the sense that the performance is below par when he is asked to make a presentation at random. Notification of an interaction session in advance also helps participants to do their home work and come prepared for the session. In other words, notification not only influences the quality of the presentation, but also the quality of participation.

Notification is normally done by sending a circular, giving information regarding the topic, speaker, date, time and venue, to the participants. It can also be done by placing a '**notice**' on the notice board that students refer to. Sometimes, this is done with the help of a '**presto-board**' kept at a prominent place.

Circulating write-ups

Interaction sessions require one or the other kind of write-up, detailed or brief, being prepared. For example, a case conference requires case study material, and a seminar requires a seminar paper, for their organisation. The write-ups prepared for the interaction sessions are circulated among the participants at least one day in advance.

Advance circulation of papers helps ensure that enough time is provided for study. Participants can give an independent thought to the contents of the write-up and concretize their reactions to it. In case he/she has some doubts which need clarification, he/she would have scope to make a library reference or consult others who have the expertise. This would minimise the number of superficial and irrelevant

questions being raised during the interaction session and thus save precious time which otherwise would have been wasted in the session.

For circulation, the write-up is normally mimeographed. It is desirable that the write-up be as brief and to the point as possible, to reduce the cost of mimeographing. If the write-up happens to be of just one or two pages length, it can be photocopied, since photocopying is less cumbersome than cyclostyling. Photocopying is also preferred, when the interacting group is of a small size consisting of only a few participants.

Apart from circulating write-ups on the topic in advance, the students (participants) should be told that it is generally a good idea to prepare before interaction. Students could read the material and prepare to support the favoured position. Everyone has an opinion but opinions backed up by facts are more credible.

Planning the strategy

As discussed earlier the tasks undertaken in group interaction sessions are classified as discussions, problem-solving, negotiation and decision-making. Before the actual conduct of the session, it would be desirable to know which categories the interactions belong to. Such a knowledge would be necessary in order to arrive at a strategy for the interaction session. Only when the task to be undertaken is known, you would be able to decide whether it would be beneficial to split the group into smaller ones or whether there is any specific task to be undertaken by the members before coming to the session.

It may be helpful if you are able to run an imaginary session bearing in mind what is known about members' past views and performance styles. You may also be able to decide whether an outside expert should be invited for the session, to enhance interaction.

From this discussion on the arranging of an interaction session, it is clear that several activities are involved. It should not be difficult for a teacher to perform all these activities. But, from the point of view of the participants, identification with the interaction session, it would be advisable to give the entire responsibility to one or two students, who can be called as the 'convener' of the interaction session, whose duty would be to undertake all the above activities. To be an effective convener he would require frequent supervision, guidance and encouragement from the teacher.

Self-assessment

4. Match the teacher's activities in Column 'A' with those of the roles of teacher in arranging interaction session in Column "B". Each role in Column "B" can be used more than once or not at all.

Column A

- i) An Economics teacher asks two students to speak for and against mixed economy, in a debate session.
- ii) A Sociology teacher decides the topic- Casteism in India for the panel discussion.
- iii) The teacher displays 'Educational Research and the National Policy on Education 1986' the theme of the minar, on presto-board.

Column B

- a) Circulating write-ups
- b) Motivating
- c) Identifying the theme

- | | |
|---|------------------------|
| <p>iv) A Science teacher distributes the copies of a seminar paper named, "Depletion of Ozone layer-its impact on Environment" amongst the members.</p> <p>v) A Political Science teacher announces the theme of the next seminar "the Debacle of Communism in Eastern Europe", in the classroom.</p> | <p>d) Notification</p> |
|---|------------------------|

Conducting an interaction session

It may be recalled that the responsibility of conducting an interaction session rests with the Chairperson. This section, hence, deals with the care and the precautions to be taken, and skills involved in chairing an interaction session.

According to the Oxford English Dictionary, a Chairperson is the occupier of a chair of authority. Specifically, the person who is chosen to preside over a meeting, to conduct its proceedings and to occupy the chair or seat that is provided for the exercise of that function. The skills of a Chairperson are meant to be those behaviours relevant to the conduct of group interactions. It is an area of socially skilled behavior. The Chairperson, being formally recognised as leader of a group, is required to execute socially skilled behaviour, appropriate to the groups' conception of his/her role and to the tasks confronting it. As such, these can be learned and improved upon howsoever expert or inexperienced the performer is. Effectiveness of an interaction session depends on the skilled performance of a Chairperson and on different roles comprising it. The roles played by a Chairperson during an interaction session are that of an initiator, motivator, facilitator, elaborator, moderator and controller.

Initiator

Many an interesting group fails to interact meaningfully due to, what may be called, the 'starting trouble'. It is considered to be the duty of the Chairperson to set the ball rolling.

A Chairperson is normally expected to introduce the speaker and the topic in his/her introductory remark. If the members have not met before, it is obligatory that they too are introduced to one another.

Quite often you may find that, a Chairperson undertakes the initiating job more as a formality than as a necessity. He/she would announce the topic and speaker for the session in couple of sentences and leave the floor to the speaker. Even though it is true that the Chairperson should not spend too much time on introduction whereby almost testing the patience of participants, a well spent introduction would have its share in the effective use of the discussion time.

The Chairperson should have a fair knowledge of the topic and on how the speaker plans to present it. A brief talk with the speaker before the session would supplement the homework done by the Chairperson. A few important questions raised during introduction would help the participants focus their attention during presentation.

After the speaker has completed the presentation, the Chairperson may help the participants to recall, in a nutshell, the main points of the discussion. He may also clarify the procedure for interaction by organising the discussion on different sub-themes separately and by not taking all questions together, or seeking questions in specific rounds and numbers for interaction.

At times, it may happen that the group is not at all acquainted with group interaction, in the sense that, the members might not have attended any interaction session earlier. On such occasions, it would be beneficial if the Chairperson lays down the norms for interaction such as, pointing out that a member should speak only after obtaining permission from the Chairperson, or that every question should be addressed to the Chairperson, etc.

The student or the teacher can provide discussion questions that they use to start the discussion. Usually it is best to begin by asking if there was anything in the write-up/handout that anyone did not understand. This allows students to frame questions and to get them answered to that all start with approximately the same understanding of the knowledge base.

Motivator

Participation in an interaction session is a voluntary behaviour and hence, you will agree that it cannot be forced on the participant. Compulsory participation fails to achieve the purpose of the interaction session. But, it has been commonly observed that, quite often, members of an interacting group either refrain from participating or engage themselves in, what may be called, '**passive participation**', Meaningful and lengthy interactions need motivation amongst participants and an effective Chairperson skillfully undertakes the responsibility of motivating the participants to interact.

You may like to know why participants fail to interact. Reasons for non interaction among participants could be many. Some individuals are generally withdrawn by nature and they continue to be withdrawn in an interaction session as well. You may also find a few aggressive speakers in the interacting groups who, though not deliberately, scare away certain other participants. At times, non participation may also be due to general apathy among participants who are fatigued or who are meeting at an odd time.

It may sometimes be possible to trigger off the participation of indifferent but sensitive members by raising thought-provoking issues or by making provocative statements. But, what about those who indicate that they have no wish to contribute by looking down or avoiding eye contact or assuming a posture as if in deep thought? Such members may occasionally respond if they are formally invited to contribute to the discussion by the Chairperson. Even when given an opportunity, it may sometimes be declined with a smile or a spoken 'no'. It is likely that informal conversation and encouragement before and after an interaction session might make them confident to take part in subsequent sessions.

It is a common fact that people influence one another. In an interaction session also, one finds both the positive and negative influence of certain members on certain other members. Such an interpersonal influences in an interacting group is called '**social facilitation**'. In other words, some participants either participate zestfully or are too inhibited to participate in the presence of certain others in the group. Social facilitation may be either due to the mere presence of some persons or due to certain behaviours exhibited by some people which might have helped or hurt.

The mere presence of one person may demotivate some participants if he/she is known to be authoritarian, grim, crude, or critical in approach to others whereas, those who are known to be democratic, cheerful, sophisticated or tolerant tend to motivate others. People in authority such as classroom teachers are generally found to evaluate student behaviour and make occasional remarks. This formal or informal evaluation makes the person being evaluated conscious of his/her behaviour and the mere presence of an evaluator may have adverse influences on the participant's behaviour.

For a Chairperson, certain behaviours which have a motivating effect on participants need to be deliberately exhibited. Much would depend on the skill of a Chairperson as to which, when, and in what context he exhibits them to the desired effect. An approving smile, an agreeing nod, a word of commendation, make favourable impact on the participants. For example, a smile usually means 'I am on your side', 'I approve of you', 'I agree with what you are saying', whereas a frown usually suggests 'I do not approve', 'I do not accept'. Elaborating on a participant's reaction, toning down the sharp edges of an opposing view, seeking views from or sensitively questioning the silent members, have also motivating effect on participants.

As their teacher, you need to help the students feel safe by creating a psychologically secure learning environment. Students who are afraid of embarrassment or ridicule are unlikely to participate in the interaction session no matter what the incentives are. If students do not know, they can be ridiculed and they can be ridiculed if they know wrong, too. Therefore, many would rather lurk than participate. To facilitate interaction, teachers should help students develop tools to talk from which will facilitate their participation in discussion. Tools include notes, outlines, and definitions of terms, readings (accomplished prior to the discussion class), formulae and definitions of components. Other tools include examples and discussion questions which can be student or teacher created. Given these tools the novice will feel more comfortable in participating in a discussion.

Facilitator

The most critical role to be played by a Chairperson is to facilitate interaction, no matter who the group or what the tasks of an interaction session may be. Assuming then that the Chairperson wishes to facilitate full discussion of a topic, how should he proceed? Researches say that undergraduate seminars are much improved if the students are given specific tasks to complete before the seminar. Emphasis is also laid on '**pre-discussion discussion**' to improve interaction. Circulating write-ups in advance is also likely to improve discussion. Similarly, a Chairperson might do well to take separately to '**key individuals**' to have a feel of the issues that are likely to provoke lengthy debate and those which are more likely to be dealt with quickly.

Once the discussion of the topic begins the Chairperson has to introduce and clarify the issues for discussion. This may be divided into introducing the aims of the discussion and stating the specific issues to be discussed. At times, views expressed by some participants may not be clear or may require refinement. At such times, a skillful Chairperson takes on the responsibility of clarifying and refining what has been said. This skill may be seen as comprising sub-skills of **paraphrasing, summarising, probing** and **elaborating**. At the same time, the Chairperson should avoid the temptation of becoming the main speaker and should not waste time by allowing other participants to express their views.

Sometimes, the group gets bogged down with certain issues and the participants get engaged in unproductive discussions. Or, sometimes, an issue outside the purview of the session might be discussed elaborately over a long period of time thereby, encroaching on the time entitled for the genuine business. Under both these circumstances, facilitating would mean moving on to the next issue. Moving the discussion along more quickly as part of the strategy of a Chairperson is needed when there are several issues to be discussed in a short period. To do this, the Chairperson would first size up the situation: who is speaking? What about? How are others responding? He would then consider various possibilities and, translate them into a plan of action. He might say, for example, "Well, we seem to have covered most of this topic. Whatever is remaining could be discussed more informally later on; could we now move on to the next topic?"

The promotion of an appropriate amount of discussion and the ensuring that each member of the group has a reasonable opportunity to contribute, are also important.

The Chairperson has to keep a watch on members who tend to monopolise the discussion and thereby reduce the scope of interactions. At the same time, the Chairperson himself should also restrain from speaking for a disproportionate amount of time. This may happen when a Chairperson thinks that he should give his remarks on the response of every participant. On the contrary, it is the virtue of a person chairing an interaction session, to be more an attentive listener, than a compulsive speaker. An attentively listening Chairperson facilitates greater participant interaction. Even when he has reasons to favour a view, he should defer his judgement and probably could note down for presentation at the end of the session. His interventions may be facilitative if they come in the form of key questions at different points in the discussion to open-up new issues and stimulate fresh thinking and also to ensure that each aspect of the topic is adequately discussed.

Self-explanation takes place when a more knowledgeable student explains something to a less knowledgeable student. The student who receives the knowledge benefits by receiving the explanation. The other receives benefit by articulating the information, structuring and integrating it so that it can be easily communicated. We internalize information when we verbalize it in a conversation. Conversation is the basis for social constructivist learning.

The reason underlying non-participation of students could be their diffidence and the fear that they falter for such occasions.

The following techniques could be recommended to students before you encourage someone for participation in a discussion:

- Take a deep breath, may be two or three and think about it before you fly off the handle.
- Determine what the problem is, write out a short sentence which articulates the problem as you see it.
- Determine what the argument is really about, take out the personal references and determine what the argument really is.
- Now that you know the problem and the difference of opinion, what response should you make? You can then respond to the argument and direct the discussion away from the emotion and toward the logic of the argument. Using this approach makes the other person focus on the issue rather than on personalities.
- Omit all self-reference, this leads to emotion.
- Argue with yourself rather than with the obnoxious other. See if you can argue from the view of the other person. Does the argument make sense?
- Do not bluff. Look for authoritative information that is valid and not emotional to support your point. Gathering information and presenting it is a good way to defuse some arguments.
- Ignore bullies. Some who are very insecure will attack almost anything. Don't waste time on them, ignore them. If attacks continue notify the person who controls the discussion and have the offender silenced.

Elaborator

The need for elaborating participant responses in an interaction session arises when participants have difficulty in expressing their thoughts in words, or when the participants have a tendency to make too many assumptions which call for a brief response. Elaborating is needed even when participants, such as those in the undergraduate classes, have a limited mastery over the subject/topic of discussion. In a sense, elaborating participant responses is to facilitate interaction as much as

to make it more profound. Hence, the role of a Chairperson as an elaborator can also be viewed as a special none in his role as a facilitator.

In order to be an elaborator, the Chairperson should have a global perception of the totality of the topic of interaction. This probably is not available with many groups of students in higher education. This includes all round information on the topic even outside the specific limits set by the speaker and the details of the topic itself. Adequate attention to the write-up prepared by the speaker will often enable the Chairperson to foresee areas of difficulty, complexity or dispute which call for elaboration. If the Chairperson has a knowledge of the various members constituting the group, it would enable him to anticipate the kind and level of interaction that will take place to some extent.

Moderator

The two main components of a Chairperson's skill as a moderator are his ability to moderate the length of time taken by the members to express their thoughts, feelings, opinions, directions and suggestions; and to moderate the general climate of interaction with a view to maintaining the warmth of the interpersonal feelings, and not degenerating them.

The promotion of an appropriate amount of discussion and ensuring that each group member has a reasonable opportunity to contribute to the interaction, should get proper attention from a Chairperson. A skilled Chairperson thinks in advance about the strategy that he is going to follow to make an appropriate allocation of time. He would translate his strategy into a procedure and would formally announce the procedure before the announcement of the discussion.

He should also be aware of the relative status of members and should be sensitive to a status hierarchy which can result in domination by one or two members because of their position. He must ensure that the contributions are judged on information value and not on the office that a participant holds.

At times, a Chairperson may find it difficult to understand when a participant has finished his speech or when he has nothing more to contribute. Allowing such a person further time, might lead to a repetition of one's own reaction or a digressing from the theme. The indicators which denote that a contributor has finished or wishes someone else to take over are: dropping of the voice, pausing, leaving a phrase or sentence unfinished, or filling the silence with 'err' or 'mm'. Other signs are hand gestures or coming to an end or looking directly at the Chairperson.

At times, topics on which the interaction is taking place may be such that they generate quite a few intense (if not bitter) feelings among participants. This is especially true if the task of the interaction session happens to be based on negotiation or decision-making. Also, depending upon their personality make-up, participants tend to identify themselves with certain views. And this is more likely if the view is one's own. When individuals contradict each other, the interaction may generate bitter feelings. What follows would be counter productive behaviour from participants. The Chairperson, in such situations should maintain his neutrality and his capacity to mediate. If he senses that the interaction is not conducive to a general productive climate of interaction, he should skillfully shift the focus or change over to the next issue, deferring judgement.

Controller

The managerial skills of a Chairperson in controlling the interactions to provide the right kind of exposure and atmosphere to the interaction can be considered to be as important as the academic skills of the Chairperson. An uncontrolled interaction would, more often than not, be lacking orderly, purposeful and clear interactions. As the interaction session progresses, it is expected that the Chairperson keeps the discussion orderly, systematic and purposeful. Implicit in this is the need for control

and at all times, the Chairperson should be very much in command of the situation. The Chairperson is the leader of an interacting group and occupies a '**chair of authority**'. Even though authority is essential for a disciplined conduct of the session, it should not be over exercised for self-aggrandizement. To be effective, he must exercise his authority judiciously. He needs to achieve control without antagonising any member and without appearing to impose undue pressures. It is very important that the Chairperson should avoid confrontation with members of the group, even when faced with some awkward participants.

Social psychologists have identified two types of leaders in interacting groups (1) a '**task**' leader who is oriented toward achievement of the group's formal goals, (II) A '**maintenance**' leader whose orientation is towards the support of group cohesiveness and members' personal well-being and morale.

The effective Chairperson would be one who manages to integrate task and maintenance roles and alters his behaviours flexibly as the tasks and situations demand.

The main area of concern for the Chairperson as a controller, is the effects of status on how people behave in a group and what others think of them. In fact, many other differences among people such as age, sex and social class often get reduced to status differences in an interacting group. One frequent property of lower status is talking less or not talking at all and that of higher status is monopolizing discussions. A status conscious group tends to be heterogeneous.

Heterogeneity in terms of differences of opinion, personal background and status need not hinder fruitful discussion; in fact, it may even help bring in different perspectives and thus enrich the interaction.

But if heterogeneity leads to status consciousness and person talk more out of their positional authority, it could well be a stumbling block. A Chairperson will have to exercise his authority against status hierarchy in a group if the participants feel that they have been given full opportunity to express their views, irrespective of their status and that, their contribution has been significant in making decisions. Also, individuals should be made to recognise that the Chairperson will not be prepared to accept, even from higher status participant, unnecessary lengthy expositions when it is clear that a little of substance is enough.

Closing an interaction session

An interaction session comes to an end either due to the fact that the participants have nothing more to contribute or when the time allotted for discussions has passed. However, all formal interactions close with the remarks of the Chairperson. Even though it is possible for a Chairperson to close the session with a single sentence announcement, the concluding remarks of an efficient Chairperson would contain something more.

Before closing the session, it is desirable that the Chairperson highlights the contents conveyed during the discussion in a summarised form. Quite often, he may miss a few points from the discussion if he relies only on his ability to remember things. Hence, it is advisable that the Chairperson keeps track of every detail of the discussion by proper note taking. It is not only impossible but also not necessary to noting prepare a sentence by sentence note. What is expected is the noting down of the name of the contributor and the theme of his contribution. Noting down names of the contributors has an advantage in that, certain important contributions made can be acknowledged and the credit given.

Apart from summarising the content, it may be desirable that the Chairperson makes remarks on the conduct of the session as well. Without making any personal references and without thereby hurting the feelings of participants, certain general

remarks commending desirable behaviors and cautioning against undesirable ones may be made with a view to making the future sessions more effective.

Apart from summarising what has been observed during the session, the Chairperson truly gets an opportunity to express one's personal views, ideas and opinions while making the closing remarks. The remarks may also contain what conclusions can be drawn, what agreements have been reached or what decisions have been made as a result of the interaction.

Leaderless groups

Interaction groups when small (say five to ten participants), need not be led by a formal Chairperson. The teacher may assign them a topic or a problem (or the group may itself select one) and leave it to the group to decide on to proceed further. The group may decide to nominate a convener who would perform most of the functions expected of a Chairperson in a formal large group setting. The teacher however, may acquaint the groups with the different roles expected to be played to achieve the task as well as to maintain the group. Different members of the group may play these roles. For example, when one of the participants does not get a chance to speak because of the domination of another, a third member may come to the rescue and request the dominant to give a chance to the "shy" participant. Similarly, one of the participants may volunteer to summarise the discussion at the end. In other words, the group need not have a leader appointed by an external authority (as a teacher). The members would volunteer to perform the roles necessary for group functioning in a cohesive manner.

In the present context of our colleges/universities, it is highly desirable to provide such opportunities to our students so that they themselves can perform these roles and learn to become productive participants of a democratically functioning learning society.

Self-assessment

5. *List any ten skills of a Chairperson for effective conduct of an interaction session.*

Follow-up of an interaction session

Interaction sessions organised for instructional purposes in higher education are not to be treated in isolation from other instructional activities. They need proper integration with student's self-study and teacher-initiated activities for optimum effectiveness. The teacher, being the organiser of an interaction session, should have a clear idea as to what proceeds an interaction session and what follows it. Hence, a proper follow-up of an interaction session can be seen as a deliberate, purposeful venture on the part of a teacher.

Follow-up of an interaction session depending upon its appropriateness may include:

- i) organising lecture-discussion session,
- ii) organising interaction session in continuity,
- iii) organising real/contrived demonstrations,
- iv) arranging field visits,
- v) providing reference materials,
- vi) encouraging library readings, etc.

The follow-up is also done to understand the participants' opinions and reactions to the interaction session. Information regarding the likes, dislikes, satisfactions and

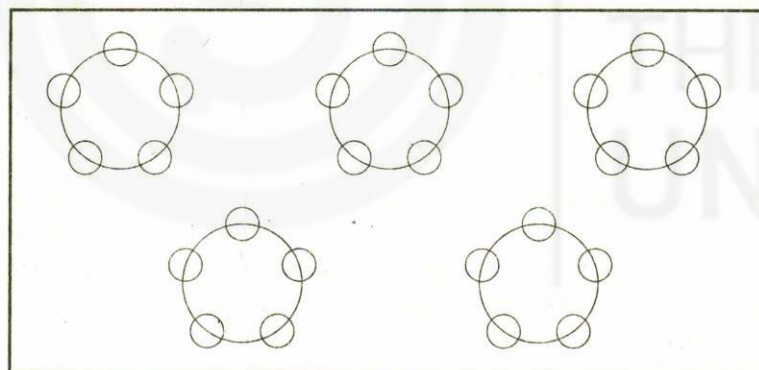
frustrations of the participants can be quite useful in the improving of the quality of the interaction sessions that follow. Participants' reactions also provide valuable feedback information on the effectiveness of the Chairperson by highlighting the strengths and weaknesses therein. One may think that one has done a wonderful job as a Chairperson whereas the truth may be entirely different.

Seating plan for an interaction session

The physical environment in which interaction takes place influences significantly the kind and the quality of interaction which takes place. From among the different factors of physical environment, the seating arrangement is one that greatly determines the interaction patterns and is one which is well within the reach of the teacher to change, if need be.

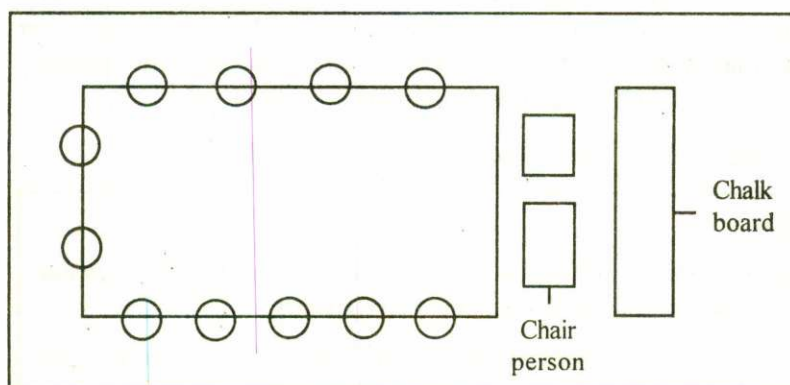
Can you imagine a lecture hall seating arrangement in which the students face side-ways and not forward from where the lecturer stands? Students in a lecturer hall always face the lecturer to provide him with the scope of having eye-contact with each and every member in the hall. In any face-to-face communication, eye-contact is a must not only to receive the exact message, but also to provide the feedback regarding its effective reception.

In a group interaction session also, there is the need to provide for eye-contact amongst every member of the group and so also between the Chairperson and the members of the group. Hence, the seating arrangements need to be different from what is normally found in classrooms. Since the physical layout of the room can foster or hinder free interaction, it needs to be ensured that the group members can see each other without having to change their posture; this helps to heighten the impact of non-verbal and verbal behaviours during interaction. A few exemplar seating plans are given below which establish orientation for everyone.



Arranging
moveable
Chairs to make
small circles

Figure 2: Many small groups in the same big hall (e.g. buzz sessions)



Usual
Classroom
Size

Figure 3: For a large group — but not than twenty or so. (If members are many, more interactions among them become difficult)

Norms during an interaction session

Whatever be the kind of group, the group processes are smooth and effective if the group members follow certain norms governing that group. At home for example, the group of family members are governed by norms such as respecting the authority of parents or adhering to an implicit time-schedule for different activities. Similarly, in order that the interactions take place in a disciplined atmosphere, the members of the group have to follow certain norms.

You would agree that participants would lose their attention if they are distracted. The distraction may be caused by one participant when he intervenes improperly or resorts to talking to someone by his side when he is not in agreement with the speaker. This may happen when participants have '**hidden agendas**' such as establishment of friendship bonds, settling of old scores, boosting of self-image, and so on. Even late coming on the part of a participant, noisily occupying a seat, or enquiring about the discussions already made can have a distracting influence on the proceedings of a session.

The need for settling old scores may be felt by a participant if he brings in the negative opinions/feelings regarding a certain other member. Normally, this is done by vehemently disagreeing just for the sake of it. Disagreement is not improper if it is because of a certain data he has, or if his disagreement is on rational grounds. What is essential to be understood is that disagreement is always to a view and not with the participant who puts forth the view. Hence, involving one's ego in the discussion and unduly defending one's own point of view without giving proper thought to other's views, is not conducive to a group interaction session. As interaction session can be effective if the interaction takes place in an atmosphere of mutual respect and equality of status. This can be possible if a member merely makes brief interventions and duly respects the authority of the Chair in the taking of one's turn. If a member wishes to contribute, he may go through the prescribed channel which means he will make signals to the Chairperson, such as **raising a finger or hand**, and waiting till the Chairperson allows him to speak. This would reduce the possibility of uncontrolled verbal exchanges between participants. Much of the ego involvement and verbal exchanges can be reduced, if every participant makes his contribution facing the Chairperson and not a particular participant.

Of course in small groups, there may not be a formal Chairperson. In such groups what is important is the respect for each participant has for the other and the attitude of positively helping others in expressing their views, and if necessary, elaborate them and harmonise them with the views expressed earlier. To the extent that all members of a group display such respect, the discussion will be fruitful.

Evaluating an interaction session

Evaluation of the effectiveness of an interaction session may be done in several ways. If some forms of evaluation are casual-unsystematic by nature, there are others which are formal-systematic. Some of them include informal conversations, anecdotal records, students' self-reports and systematic observations.

We shall discuss some of these techniques in Unit 14 of Block 3.

Self-assessment

6. *List any three types of behaviour to be followed by the participants which have a favourable influence on interactions.*
7. *In what ways can the follow-up of an interaction session be undertaken?*
8. *Give two reasons for the need for changing the seating plan of a classroom to conduct a group interaction session.*

Summary

A group interaction session is an input alternative for instruction at the higher education level. Interaction sessions at the higher education level could be formal or informal i.e., - leaderless groups. A Chairperson, a speaker, participants, an observer and a recorder are the elements of an interaction session. The tasks undertaken in any interaction session can be categorised as discussion, problem-solving, negotiating and decision-making.

The three phases of organising an interaction session are: (1) arranging an interaction session, (2) conducting an interaction session and (3) follow-up of an interaction session.

Arranging an interaction session is a deliberate activity, which has considerable influence on the effectiveness of the interaction session. The tasks included in the arranging of an interaction session are identifying themes, motivating, notification, circulating write-ups and planning the strategy. Even though each of these activities is essential, the task of motivating is crucial for the success of an interaction session.

The responsibility of conducting an interaction session lies with the Chairperson or the convener nominated by the group. The Chairperson, who is the leader of an interacting group, should possess a variety of skills for a smooth and effective conduct of the session. The skills and considerations for a Chairperson can be viewed in terms of the roles he plays during the interaction session. A Chairperson is expected to skillfully execute his roles as Initiator, Motivator, Facilitator, Elaborator, Moderator and Controller. He also requires skills for closing the session. In small informal groups these roles are expected to be played by each member.

Most often than not, an interaction session required appropriate follow-up activities. Follow-up can be done by providing learning experiences to strengthen what has been done in the interaction session.

In order that interactions take place smoothly, the physical environment in general and the seating plans in particular, play an important role. The seating plan should be such that easy eye-contact is possible amongst the members. The smooth conduct of a session is also dependent on the supporting behaviours displayed by the participants. Norms such as respect for others, tolerance, proper taking of turns have their influence on the quality of interactions. Evaluation of interactions could be done through informal conversations, anecdotal records, students' self-reports and systematic observations. Systematic observations are more objective, elaborate and valid than others.

Unit-end activities

1. You may have participated in some kind of interaction session or the other. Try to remember one such session with which you were satisfied and analyse your experiences, describing the factors which made the session fruitful to you.
2. Analyse the subject-syllabi you are teaching and identify some topics which can best be dealt with by an interaction session where you or another subject-matter-specialist can become a Chairperson. Also find some topics which can be assigned to small groups for discussion. Also plan for the specific follow-up activities.

Points for discussion

In a democratic country like ours we have to inculcate the habits of constructive group discussions and learning through interactions. To what extent can college

studies help develop these habits among our young citizens? In what way can you as a teacher, promote such practices? What are the obstacles you see in implementing interactive methods of studies and what are the ways of overcoming these obstacles?

Suggested readings

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Answers to self-assessment

1. Group interaction sessions generally help the group members to develop affective attributes, socio-emotional skills, leadership qualities, etc.
2. The elements of a group interaction session are:
 - a) the chairperson
 - b) the members
 - c) the recorder
 - d) the speaker
 - e) the observer
3. **Discussion** : to share and clarify ideas, opinions and information
Problem-solving : to help participants organise information in new configurations.
Negotiation : to settle differences when more than one solution exists for a problem
Decision-making : to make judgements about a problem where no immediate right answer is available.

4. Col. A	Col. B
i)	b)
ii)	c)
iii)	d)
iv)	a)
v)	b)

5. Some chairmanship skills are:
 - a) the skill of introducing the topic;
 - b) the skill of communicating the strategy for interaction;
 - c) the skill of motivating non-participants;
 - d) the skill of providing equal opportunity to participants, for interaction;

- e) the skill of using verbal and non-verbal cues for reinforcement;
 - f) the skill of leading the discussion towards a goal;
 - g) the skill of allocating time;
 - h) the skill of deferring judgement;
 - i) the skill of maintaining a climate conducive for interaction;
 - j) the skill of controlling unproductive behaviours;
 - k) the skill of integrating 'task' and maintenance roles;
 - l) the skill of closing an interaction session.
6. i) punctuality in attending the session
- ii) mutual respect among participants and to the authority of the chairperson
- iii) democratic turn-taking habits
- iv) addressing questions to the chairperson
- v) controlling of distracting behaviours.
7. Follow-up can be done by organising
- i) a lecture-discussion session;
- ii) interaction sessions in continuity;
- iii) real/contrived demonstrations;
- iv) field-visits;
- v) library reading.
8. i) to facilitate eye-contact among participants,
- ii) to make the interaction student-centred, rather than teacher-centred.

9

Skills of Using Communication Aids

Introduction

The instruction process is a communication process wherein knowledge, information and skills flow from the teacher on the one end to the student on the other and vice-versa. The success of any instructional activity, we could say then, depends on how best communication takes place between the teacher and the student. To facilitate the communication process, we take recourse to different kinds of lecturing skills, organize interaction sessions and make use of a number of teaching aids like chart, map, video, computer, etc. As we have already discussed the different kinds of lecturing skills (Unit 7) and skills of conducting interaction sessions (Unit 8), the focus of this unit will be on skills of using teaching aids or communication aids.

Learning outcomes

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

- describe the reasons for using communication aids;
- classify audio-visual communication aids on the basis of the sense they stimulate;
- plan the use of the blackboard/chalkboard;
- prepare and use charts, models, posters and such other non-projected teaching aids;
- prepare and use slides and filmstrips;
- make use of instructional television for instructional purposes;
- use the overhead projector (OHP) in the classroom instruction;
- prepare and use (OHP) transparencies; and
- suggest ways of using computer-assisted instruction and for individualised instruction.

Classroom instruction and communication aids

All instructional activities aim at helping the learners to achieve the specific instructional objectives set by the teacher, in the best possible manner. This is why the teacher uses, apart from classroom lecturing and interaction skills, a number of communication aids which range from the blackboard to sophisticated computers. The use of communication aids creates readiness in the learner for learning experiences. Communication aids provide clarity, precision and accuracy of information processed. Communication aids can be used in all (some content in this unit has been reproduced with necessary modifications/revision from Unit 11: Application to Computer Programmes of ES-361. Educational Technology, SOE, IGNOU) phases namely, the development, organisation and the summarising phases of classroom instruction.

There could be several reasons for the use of communication aids by the teacher. A few important reasons are as follows:

- a) **Multiplicity of objectives:** You know that the instructional objectives to be achieved through teaching are many and varied. You also know that Benzamin Bloom has given us a "Taxonomy of Instructional Objectives". Achieving these objectives would, as stated before, require organizing various learning experiences, and by necessity, this would mean the use of various media and materials. This may be summarized as follows:

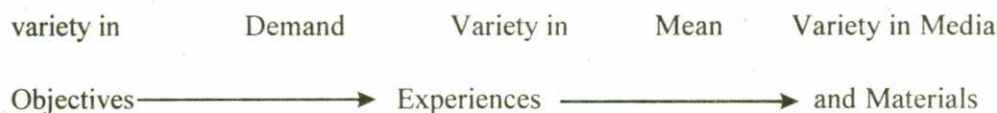


Figure 1: Linkage between objectives, experience and media

- b) **Teacher incompetence:** In order to organise instruction effectively, a teacher requires to possess a large number of competencies. In situations of oral communication, he needs to possess an audible voice, which could be modulated or even produced rhythmically as in teaching of poetry. In visual communication, he needs competence to write legibly and draw accurately. From the angle of content, one needs a good memory for presenting accurate data and sequentially organized content. Despite his efforts, a teacher may not possess all these to a high degree and hence would run the risk of becoming ineffective. However, he can overcome such risks if he uses teaching aids such as audio cassettes, graphic aids, and transparencies.
- c) **Learner motivation:** It is a known fact in educational psychology or for that matter in advertisement, that attention is a prerequisite to learning. Only a motivated learner has the attention needed for learning. Unless there is variety in the situation of learning or the material being learnt, providing continuous attention is a difficult task for the learner. Stimulus variation in teaching has a desirable effect on the learner motivation. Use of teaching aids ensures stimulus variation.
- d) **Appropriateness of learning experiences:** While teaching a group of learners, as seen in a classroom, it is not enough that the teacher has appropriate material. It needs to be ensured that the appropriate material is presented appropriately as well. For example: If a small picture or photograph is appropriate for an individual learner, its use in classroom may require that the picture is enlarged, say with the help of a projector so that its presentation becomes appropriate. Use of teaching aids, then, is also with a view to ensuring that learning experiences are presented suitably.

Self-assessment

1. Describe the importance of using communication aids to make instruction more effective.

Classification of communication aids

Communication aids include the various teaching aids that are used in the instructional process. These aids can be classified according to the senses they stimulate and the message codes they transmit (See Box-I).

- i) Audio
 - a) Voice (any human sender of the message)
 - b) Gramophone records
 - c) Audio tapes, to be used in a tape-recorder or language laboratory
 - d) Stereo records/tapes
 - e) Radio
 - f) Telephonic conversations.
- ii) Visual (Verbal) print or duplicated
 - a) Textbooks, supplementary books
 - b) Reference books, encyclopaedia, etc.
 - c) Magazines, newspapers, etc.
 - d) Documents, clippings from published material
 - e) Duplicated written material
- iii) Visual (non-projected, two dimensional)
 - a) Messages/pictures on roll-up board
 - b) Flat pictures, cut-outs
 - c) Posters, charts, graphs, etc.
 - d) Cartoons, comics, etc.
- iv) Visual (non-projected, three-dimensional)
 - a) Models, mock-ups, display materials
 - b) Diagrams
 - c) Globes or maps (three-dimensional)
 - d) Specimens (animate or inanimate)
 - e) Puppets
- v) Visual (projected-still)
 - a) Slides
 - b) Film strips
 - c) Overhead transparencies
 - d) Micro image system: micro film, micro card, micro fiche
- vi) Audio-visual (projected-motion)
 - a) Film
 - b) Television
 - c) Close-circuit television
 - d) Video cassettes

- vii) Multi-Media packages (for more than one sense)
 - a) Slide + tape + workbook
 - b) Slide + tape + workbook
 - c) Radio + slide or posters (Radio vision)
 - d) Film + posters + workbook (print materials)
 - e) Television + workbook (print materials)
 - f) Any of the above + group discussion
 - g) Any of the above + introductory and summarising talk by teacher/leader of the group.
- viii) New emerging media (all of these are multisensory)
 - a) Tele-conferencing (group discussion through telephones)
 - b) Cable television (localised television where feedback is possible)
 - c) Satellite television/communication satellites
 - d) Computer networking
 - e) Video discs
 - f) Mini computers/micro computers/word processors.

Source : S.S. Kulkarni, (1986). Introduction to Educational Technology, Bombay: oxford & IBH Publishing Co., pp. 143-144.

The above classification of communication aids provided a clear and comprehensive picture of different aids which could be used by teachers. By and large, the non-projected aids are used by most of the teachers because of their availability in educational institutions and ease of handling them. However, now-a-days, most of the educational institutions are gradually being equipped with projected aids. Since it is not possible to explain all aids mentioned above, we have selected a few of them which are commonly used by the teachers in higher education institutions.

Activity-1

Make a list of the various aids available in your institution. Classify them according to the senses they stimulate.

Skills of using some non-projected aids

Blackboard/Chalkboard

The black board/chalkboard is the basic and the most commonly used non-projected medium. In this, displays can be written or drawn using chalk on the various types of wooden or glass like surfaces.

Previously chalkboard was called as blackboard, as all chalkboards were black in colour. They were made of wood and painted black. Later on it was realized that other colours, particularly green were better. Hence now-a-days, chalkboard is the commonly used term. The writing surfaces for the chalkboard are now made of cloth, various forms of plastics and other synthetic material also. Some of the common colours used are green and white. On the green colour board, it is preferable to write with yellow chalk, while on the white boards, many different colours (usually

felt pens) can be used. It has been found that these colour boards produce less glare and reflection. They are, at the same time, less prone to ghosting (mark left when the chalk is rubbed out), and in general, provide greater legibility than the traditional blackboard. Marker boards and magnetic boards are other substitutes to the blackboard.

Use of chalkboard in different situation

This is an age old instructional aid which, to this day, has not lost its place in the classroom due to its versatility, inexpensiveness and utility. It can be used in the following ways:

- systematic display of virtually the entire subject matter, the concept map of a lecture or a proposed lesson.
- Display of a skeleton guide to such a lecture or lesson, e.g., in the form of a set of section and sub-section headings.
- Display of specific items (maps, diagrams, tables, etc.) during such a lecture or lesson.

The use of a chalkboard can be effective in most instructional situations provided one knows how to use it appropriately. Today, the chalkboard is used with the OHP. With the OHP, pre-prepared materials can be shown and chalkboard can be used for displaying impromptu materials (words, equations, diagrams, etc., that become necessary as a result of unexpected turns in a lesson), and material which develops in the course of the lesson through interaction with the class (ideas produced by buzz groups, experimental results, solutions to tutorial exercises, and so on). This is not to say that OHP (discussed below) cannot be used for impromptu material. One can write on a transparency even while lecturing. But if one wants to keep that material/message for a longer time for the students to see it is desirable to use a chalkboard. Thus, it is still advisable for all of us (teachers, instructors and trainers) to develop a reasonably good proficiency in writing on a chalkboard so that we can cope effectively with such requirements and not depend only on already prepared slides or OHP transparencies.

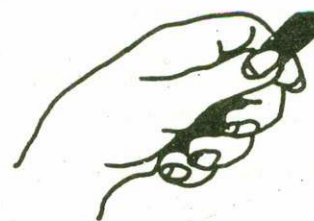
Writing skills

Writing on a board is different from writing in a notebook. Even holding a chalk stick is a special technique. The chalk should be held between the fingers and thumb, with the non-writing end pointing in towards the palm of the hand, and should be presented to the board at a fairly low angle.

The



How to present the chalk to the board



How to hold the chalk

Figure 2: Techniques of holding the chalk and presenting the chalk to the board

While writing on the board, we should not use the fingers to write with the chalk as we normally do with a pen or pencil. The correct technique is shown in the preceding diagram. Some other useful hints in this regard are presented below:

- Rotate the chalk slightly as you make each stroke, and change to a new facet of the chalk face for each new stroke or word (this helps to keep the lines of uniform thickness).
- Stand in such a position that you can reach the board easily with the elbow of your writing hand only slightly bent.
- Try to develop a clear writing or printing style that can be read without difficulty from the back of your classroom. Check the adequacy of the size of your letters by going to the back of the room yourself. Do not write cursive script – Figure 2.
- Leave generous space between words – this greatly increase legibility.
- Always try to achieve a neat, systematic layout, with level, uniformly spaced lines, if necessary draw light lines on the board using a chalkboard ruler or T-square.

For diagrams, readymade cut-outs in plastics are now easily available in market, use them where necessary.

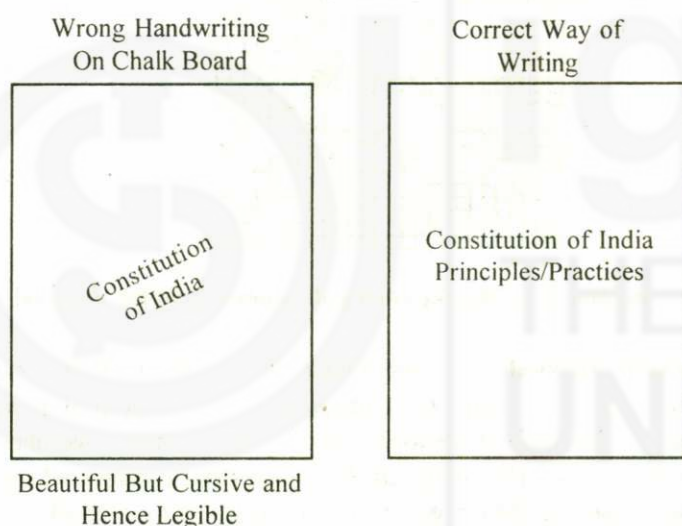


Figure 3: Cursive script and correct way of writing

Organisation (Layout) of the content

The presentation of display material on the board is an art. Space available on the board should be used judiciously.

Left	Middle	Right
For reference materials	For writing or displaying material developed during the course of the lesson, pertaining to the subject matter	For display of charts, maps, and for rough work, calculation required for mathematical problems, etc.

Fig. 4: Judicious use of chalkboard by a teacher

The proper use of a chalkboard can be done by dividing it in 3 parts with the middle one the widest one. On one corner of the board (the left portion), references or

main points are presented and the other (right) portion, is used for displaying visual materials such as maps, graphs, etc. the middle position is for the material to be developed during the lesson. The portion presents the material meant for constantly erasing and writing.

Display of graphics

The grid, the projection, the template and such other methods are used for displaying graphics on the board. Let us now discuss some of these.

- i) **The Grid Method:** This is the simplest method of drawing an enlarged version of a display. In this, the visual material is covered material or on a transparent sheet. You can decide how many times (bigger/larger version) of the visual you want to draw. After this, make the enlarged version of the grid on the board. Thus new grid will probably enable you to produce a reasonably good copy of the original material, even if you are not good in drawing.

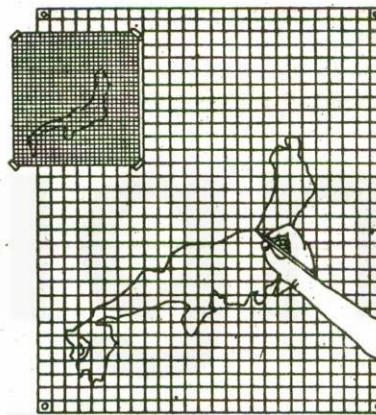


Figure 5: The grid method of producing enlarged copies of graphic material

- ii) **The Projection Method:** This technique also helps in producing enlarged version of the visual materials when projected with the help of an appropriate type of projector like slide projector for photographic slides, overhead projector for transparencies, etc. The image of the visual can be projected on the board and then the visual can be traced on the board by using a chalk.

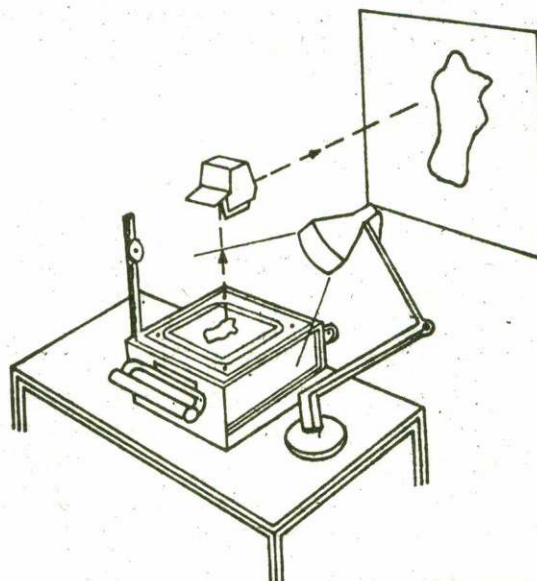


Figure 6: Using an overhead projector and desk lamp to produce an enlarged projection of an image on an opaque medium

iii) **The Template Method:** This technique is used to draw outline figures on chalkboard. This technique helps in producing visuals of the standard sizes (e.g., maps, scientific apparatus, etc.) on the board with some accuracy. Here you can prepare a suitable template of the required shape in a suitable material, e.g., lightweight material like cardboard, thin metal, rigid plastic, etc. This template can be placed on the board and traced.

In classes where Science, Mathematics, Geography and such other subjects are being taught, it is desirable to have thin lines or matrix drawn permanently in a light colour on the chalkboard or on a part of the board.

Self-assessment

2. *What are the different uses of chalkboard?*
3. *Fill in the blanks.*
 - a) portion of a chalkboard is used for references and main points.
 - b) The template method is used to draw with accuracy.
 - c) Chalkboard can be used with OHP of displaying materials.

You do not have to depend solely on the blackboard for your classroom instructional purposes. The use of charts, posters, models, etc., are some of the other aids which you may use in day to day teaching. For example, it is preferable to use the chart as well as the model for explaining the structure and working of a human eye. Hence, a brief description has been presented on some of these teaching aids.

Charts

These are also simple and convenient teaching aids. They can be used in different ways like time chart, tree chart, stream chart, flip-charts etc. All these charts are similar in nature but serve different purposes. In general, chart is a simple flat pictorial display material and if used appropriately, conveys the displayed information in a high effective manner.

1. **Time Chart:** A time chart is a representation of material in their chronological sequence of happening with suitable indication of time of occurrence. It helps students compare and contrast happenings or events in relation to time. A time chart could also be presented in a tabular form such as the railway time-table.
2. **Tabular Chart:** It presents information and data in a classified or categorised form arranged in tabular columns. Financial statements, balance sheets, profit and loss figures are best represented as tabular charts.
3. **Tree Chart:** It is a depiction of development, growth and change by beginning with a single source which then spreads out into many branches as in the case of a tree. The genealogical tree is a familiar example.

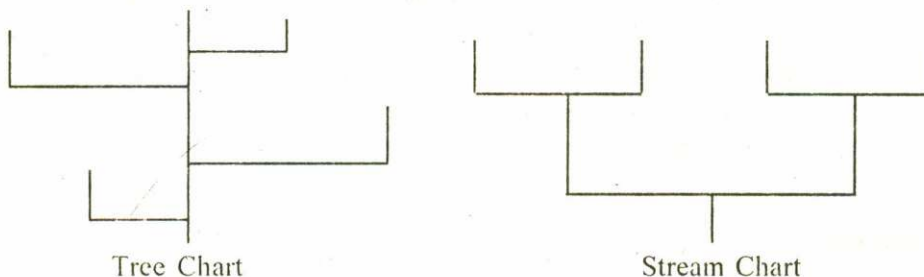


Figure 7: Examples of Tree and Stream Charts

4. **Stream Chart:** It is a depiction of development, growth and change by beginning with the many tributaries which then converge into a single channel (the stream). So, the stream chart can be said as the opposite of the tree chart. A stream chart might show all the raw material necessary for the manufacture of a finished product, such as an automobile.
5. **Organisational Chart:** It is a representation of the functional relations within an organisation. For doing so, rectangles, lines, arrows and circles are used. The administrative hierarchy in an institution or the legal system in a state can be represented in the form of an organisational chart.
6. **Process Chart:** It is a representation of the stages of steps in a process. It is usually in a cyclical arrangement such as in the case of life cycles, energy cycles and conservation cycles. They may also be the steps in the process of making something.
7. **Sequence Charts:** They normally consist of more than one segment or chart and hence have to do with the representation rather than content. 'Strip chart' and 'Flip chart' are two types of sequence charts. The first is constructed as a single chart with various sequential parts covered with strips of paper. The paper strips are removed sequentially to reveal the content in stages. The flip chart is like a calendar with a sheet each for twelve months. As the month changes, the sheet is flipped over. Actually, flip chart consists of several charts arranged in a sequential order and fastened together at one end with thin spiral, metal or wooden strip.

Flip-charts consist of a number of large sheets of paper, fixed to a supporting rod or clips along their top edges. These sheets can be used (flipped) backwards or forwards as required.

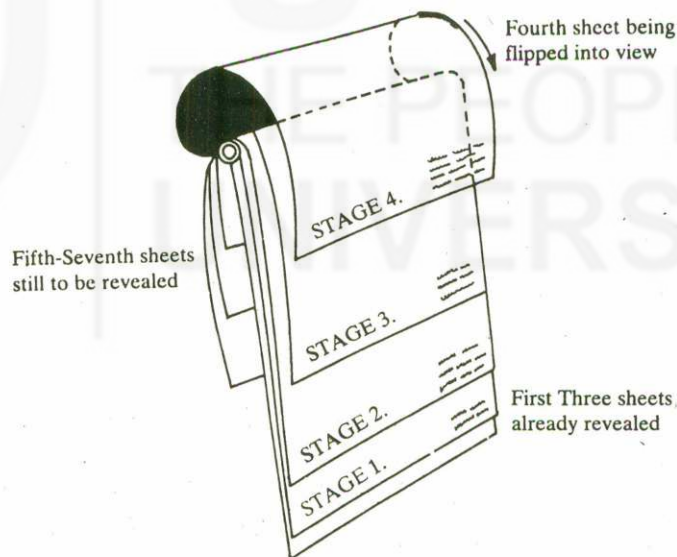


Figure 8 : Use of a set of pre-prepared flip-charts to show the various stages of a seven-stage process by progressively building up the complete process

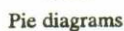
Generally all charts are used for showing pre-prepared instructional materials. The flip-charts are also used for developing the content during the classroom teaching. This can be used for displaying the successive steps of a method, phases of a reaction, etc.

Advantages

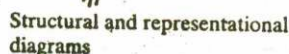
- i) They can show pre-prepared instructional material.

Generally, a wide range of charts are available commercially, it is advisable if we can use them in a classroom situation as it saves our time spent on preparation. If preparation of a chart is a must, we should identify the appropriate type of chart required. Some of the basic points needed for the preparation of a chart are given below:

- Charts are used for displaying various types of information. Some of these types of are shown here.



Tables



67

Graphics materials and lettering in charts can be prepared by using plastic cut-outs and similar techniques as used for the blackboard.

Posters paint, water colour paint, coloured adhesive papers and coloured transfer films are other ways of making the charts attractive. We can also use readymade material and photographic material for the preparation of charts as they save time spent on drawing graphics and colouring. The use of any one of them depends on their availability and their economically viability in terms of our resources.

Posters

At first sight, posters seem similar to charts, but they are usually smaller, simpler and bolder in content and style. They are mainly used for motivation and decoration purposes and for creating a certain atmosphere in the classroom. At the same time, they can be used for retrieving key points from the students.

Preparation

These are also available commercially, but if preparation is unavoidable, some of the following points may be useful for its preparation

- As the main purpose is to catch attention, it should be dramatic, with the prominent or cultural feature(s) standing out sharply.
- The message conveyed should be simple and clear so that a viewer can get it at a glance.

The techniques used for lettering, graphic and other attributes required for its preparation are the same as used for charts.

Models

Models are used for demonstrating the three dimensional representation of real things (model of an eye), or abstract things (model of Solar System). They can be used in a wide range of instructional situations. They are particularly used for three specific purposes:

- as visual support material in instruction;
- as objects for study or manipulation in individualized learning;
- as construction project for individuals, small groups or even the entire class.

Advantages

Some of the advantages of using a model for classroom instruction are as follows:

- They can reduce very large objects (e.g. model of Solar System) to a size that can be conveniently observed and handled by you as well as the students.
- They can be used to demonstrate the interior structures of objects or systems with clarity that is often not possible with two dimensional representations, (cross-section of the earth – different layers of earth).
- They can be used to represent a highly complex situation or process in simplified way that can easily be understood by learners. This can be done by concentrating only on essential features, eliminating all the complex and often confusing details that are so often present in real life system.

Preparation

We can prepare models in different ways but the use of the standard techniques mentioned will be useful

- Use of cheap materials such as cardboard, hardboard, wood and wire to prepare static models like models of a dam, a building and the like,
- Use of materials like modelling clay and plastic line to produce realistic models of living creatures, organs of a human body, and so on.
- Use of materials like plaster of Paris and paper macho to produce physical map of a continent, or a country, or landscape of a particular area.

Self-assessment

4. Correct the following sentences, if they are untrue.
- Wall charts consist of large sheets of paper, fixed to a supporting rod or clips along their top edges.
 - Posters are used to remind learners of key points.
 - Models are used to demonstrate three-dimensional representation of real things or abstracts.
5. Match the learning concepts in Col. A with the suitable non-projected aids through which they can be shown in Col. B. Each non-projected aid can be matched more than once or not at all.

Col. A

(Learning concepts)

- Heart of a human being
- GNP of India (during 2002-2003)
- Indian Parliament
- Different components of air
- Hierarchical structure of bureaucracy
- Rainfall of a particular place in a year
- A spacecraft

Col. B

(Non-projected aids)

- Pie diagram
- Flow diagram
- Model
- Histogram
- Poster

Skills of using some projected aids

In this section, we will discuss some of the projected aids and how best the teacher can use them.

Slides and filmstrips

- Aids:** When pictures, diagrams, specimens, etc. are to be shown to students, they can be mounted on slides and projected on a screen by the use of slide projector. The main disadvantage of slides is that students cannot take notes while they are being projected, as the room requires to be darkened. There are several ways of preparing slides. Diagrams, pictures, graphs, and illustrations can be drawn on a glass slide using ink or by enclosing them between two glass slides (of 120 mm) and binding them together. A micro-specimen can be projected by mounting it on a slide (e.g., blood). These are usually projected, using an epidiascope. An epidiascope is also used to project opaque objects like a page of a book or a small three dimensional specimen. Slides of 35 mm can be prepared by photographing objects, pictures, events, landscapes, etc. and by getting a dia-positive made. An over exposed scrap film negative can

be used to make improvised slides by scratching/etching a needle on it. Another way of improvising is to project photographic negatives which is much cheaper in comparison to a dia-positive. Now-a-days, it is possible to use a computer to design and produce photographic slides.

- ii) **Filmstrips:** Just like slides, filmstrips can be prepared for pictures, diagrams, graph etc. but unlike slides, there is sequential movement of them on a screen. Filmstrips can be prepared for a structured lecture/narration or a story. Filmstrips can be hooked to a tape-recorder to provide the commentary. The teacher can teach a lesson very effectively by way of stopping and moving different frames in a filmstrip. The teacher can prepare filmstrips by shooting appropriate frames in the film of a camera, and then sequencing them according to the lesson or theme he wants to deal with.

Instructional television

This includes closed circuit television (CCTV) in any educational institution, image magnification facilities, video taping and replaying and open T.V. systems run by universities or college complexes.

Surgery skills in medical colleges, laboratory skills and workshop skills in science colleges and training institutes can be taught better to students through instructional television. Instructional television also uses open T.V. systems. Thus, we have programmes UGC, IGNOU, NCERT and others on Higher Education which are telecast on Gyan Darshan from Electronic Media Production Centre (EMPC) studio of Indira Gandhi National Open University on national network everyday.

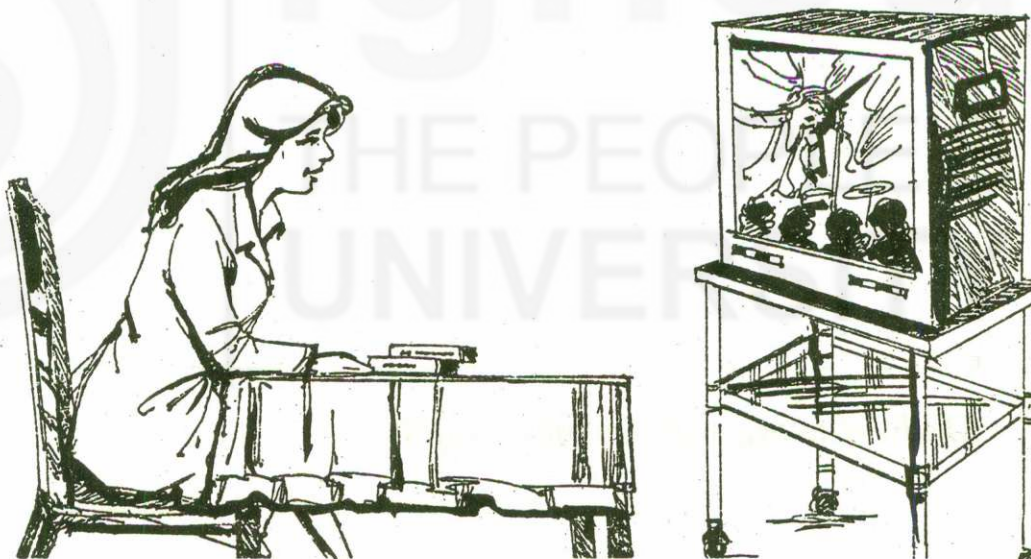


Figure 10: Learning from Television

Overhead projector

OHP is getting to be widely used in the classrooms and other teaching/learning situations. It is a medium through which, still visual materials are displayed through projection on the screen. It is a very simple instrument and one does not require any special training to master its operation. The overall use of OHP can be seen under two categories:

- i) Structure and operation of the instrument; and
- ii) Preparation and use of the transparencies

The hardware part is the instrument – the Overhead Projector. Today it is considered the most convenient tool in the hands of teachers. It has several added advantages over other visual teaching aids and specially over chalkboard or blackboard. The advantages are listed hereunder:

i) It facilitates two-way communication

While writing on the chalkboard, a teacher loses his/her eye contact with the students, but when visuals are shown, the student can still be faced. In this way the teacher can observe the reactions of the students about higher teaching process. This also helps the students to interact simultaneously with the teaching.

ii) It is a time-saving device

Visual materials can be prepared before coming to the class, thus saving a lot of time that is spent on writing on the chalkboard. Here, the materials can be prepared before hand and arranged in the right order. Thus, teaching becomes tension-free as the teacher devotes more time on discussion than on lecturing and writing on the chalkboard.

iii) It is very easy to handle

For using and handling the OHP, one does not require any expertise. If any replacement is required, it is the electric bulb, and everyone knows how to replace a fused electric bulb.

iv) No darkened room necessary

Its visual materials do not require any darkroom for developing or for projection. Thus students can take down notes throughout the lesson.

v) It is easy to transport

It is comparatively a light weight instrument which is portable from one room to another.

Structure of OHO

The OHP is a very simple instrument. It has one box which contains one electric bulb and a blower. The top portion of the box is covered with a glass plate. There are three switches on the box. One is for connecting it to the power supply. Of the two other switches, one is for the blower and the other, for the light.

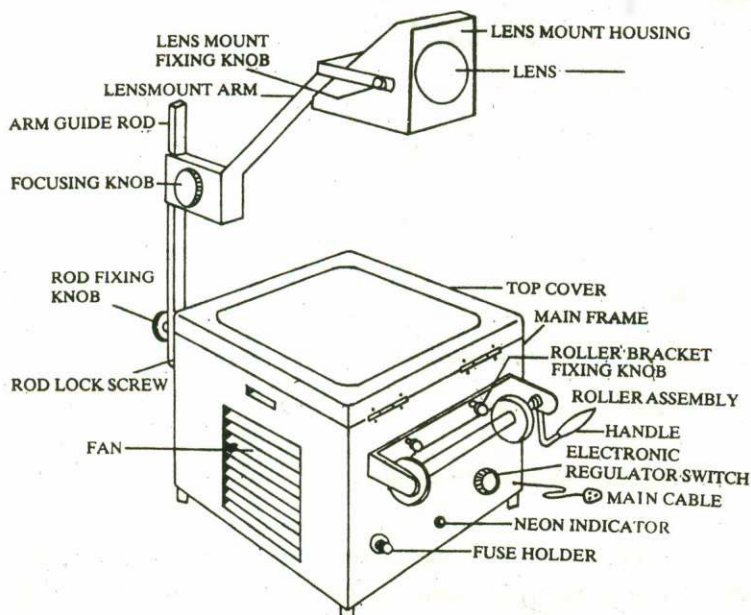


Figure 11: Structure of an overhead projector

Operation

Whenever you want to use the OHP, ensure that the glass plate, lens and the mirror are clear, and dust free. Then connect the instrument to the power supply. For use, always switch on the blower first and then the bulb. Place the transparency on the glass plate. If needed, fix it with the help of fringes/clips. View the image and adjust the mirror in position to get the brightest and the clearest image. It is advisable to fix the OHP in the classroom before teaching commences. This saves the time spent on adjusting it. Basically, to get the best of this instrument, it is essential to observe the following rules:

- i) Position the projector and screen so that the latter can be seen clearly by all the students of the class (this can be done prior to the beginning of the lecture). In many cases it is best to place the screen in one of the front corners of the room, specially if locating it in a central position would deprive you of access to a fixed chalkboard or blackboard, which you might well want to use during the course of the lesson.
- ii) Arrange the projector and screen in such a way as to eliminate or minimize two forms of keystoneing

The first type arises when the axis of projection is not at right angles to the screen in the horizontal plane, this can be eliminated by placing the projector opposite the centre of the screen.

The second type arises when the axis of projector is not in right angles to the screen in the vertical plane. This can usually be eliminated or made acceptable by tilting the screen forward (if this is possible). In the case of a fixed vertical screen, the only way to solve the problem may be to raise the level of the overhead projector itself, provided this can be done without blocking the learner's view of the screen.

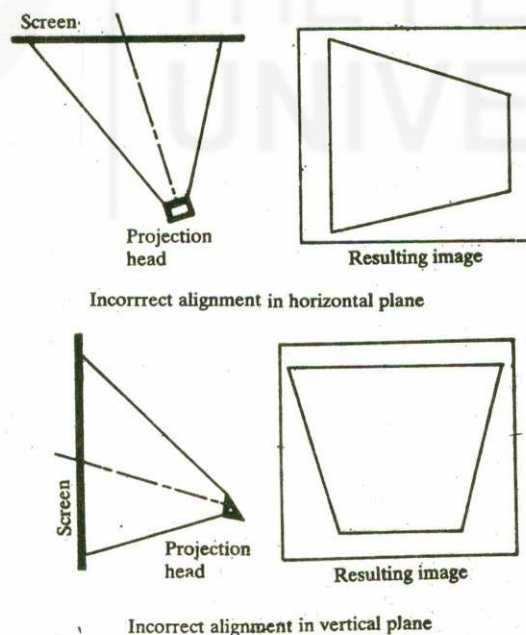


Figure 12: The two causes of keystoneing in OHP displays

- iii) Adjust the distance from the projector to the screen so that the image fills the full area of the latter when properly in focus. Failure to use the entire area of the screen can make it difficult for students sitting at the back of the room to see the details.

- iv) Make sure that the plate and head lens surfaces are clean and free from dust. Dirty or dusty surfaces can reduce image brightness and detract the clarity and quality of the display.
- v) In using OHP, the blower switch is to be turned on first and then the lamp. After use, the lamp should be switched off first and then the blower. This is important because the blower maintains the temperature of the projector to the room temperature.
- vi) The projector should not be moved from one position to another while in operation (because the bulb may go off when heated as a result of the jerk)
- vii) It should not be kept in use continuously for a long period.
- viii) Use of a voltage stabilizer is desirable, though this depends on the fluctuation of the power supply.

Preparing transparencies

The second important part is the design and production of OHP transparencies. The transparencies contain the instructional material that helps in achieving the pre-set objectives of the lecture/instructional package. Let us, therefore, have a systematic look at how to design and produce an OHP transparency.

There are two basic forms of OHP transparencies. One way is to prepare it on the continuous roll and the other way – on a singly transparency sheet. Both these forms have their respective uses.

The continuous roll

Every OHP has a provision for winding an acetate roll sheet from one end to the another. Therefore, if needed, you can insert a blank acetate roll from one end of the OHP. To move this roll from one end to the other, you can use it as a substitute of blackboard/chalkboard. This form is more useful to teachers who prefer to create/develop their display of instructional materials instantly along with the teaching-learning process. This type is preferable for calculation, derivations, and other similar subject areas. This form is preferable to the blackboard/chalkboard as there is no need to rub any of the material at regular intervals caused by lack of space as it sometimes happens on the blackboard. This also protects your hands and clothes from chalk dust. In OHP you can insert a big acetate roll that will suffice for the whole lecture. Besides this, you can sit while you teach, if you prefer so.

The single transparency

Previously, thin sheets were available for making OHP transparencies. These sheets had a tendency of curling up. Therefore, such transparencies were fixed on a plastic or cardboard frame. Such transparencies were called mounted transparencies. Now-a-days storing these thick transparency sheets in their blank boxes is quite common, as they are very handy to store and to carry. While storing, however, it is advisable to keep some blank sheets of paper in between two transparencies to ensure that they do not stick to each other.

Although single transparencies are also used for creating the supportive display material simultaneously with lecturing in a classroom. It is advisable to use them in the production of prepared instructional material. In the coming paragraphs, the design and production of a single OHP transparency are discussed at length.

Design and preparation of an OHP transparency

An OHP transparency can be prepared by a number of methods but the basic steps for its preparation, remain the same in all the methods.

- i) **Drafting:** Generally all the supplied blank acetate sheets are larger than the top glass frame of OHP. Thus, some standard measurement area should be decided first. The marking of the area avoids the cutting of the material on projection. One of the simplest methods is to prepare a draft. For this, cut out a square shaped thick white card of suitable size, and mark the effective outline of the OHP platen, using a black felt pen or a marker. This can be used as the work surface and guide for preparing the future transparency sheets. This area (grid), can be marked with a felt pen. The acceptable space for a grid is square. The grid can be easily produced manually. It is also helpful to stick two small pieces of Blue-tack or similar rubber adhesive to the top edge of the card as shown in the Figure 13. These pieces of Blue-tack hold the acetate sheet firmly in place while you work on it.

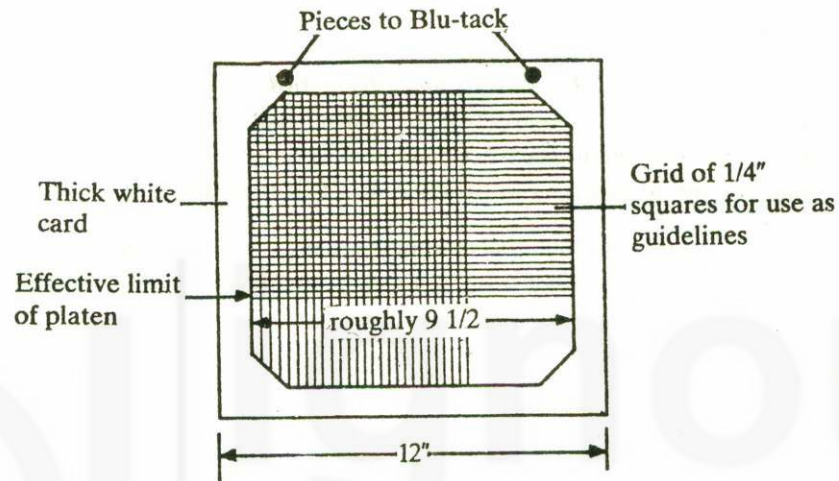


Figure 13: A home-made work surface for the preparation of OHP transparencies

- ii) **Production of OHP transparencies manually:** This is another simple and quick way of producing an OHP transparency. In this, either water-soluble or permanent marker pens are used for writing/drawing. The use of the specific type of pen depends upon the content. If a transparency is to be re-used, it is preferable to use medium-tipped spirit based pens rather than water-soluble pens. Black, red, blue and green are the preferred colours because they get reflected better on the screen. If a large coloured area is to be shown, the use of colour transparency in that shape is advisable.

Written material should be presented in a writing or printing style. This enhances legibility to the optimum level. The smallest lettering to be used on a transparency should be quarter of an inch, allowing for normal viewing and lighting condition. Lettering also varies from situation to situation. Generally, type-written letters are avoided due to their distress-causing nature. Generally capital forms are preferred for short titles and emphasizing points and running printing style for the other matter.

A gap of roughly 1/4" is advisable in between lines and proper spacing should be used in between the words. For producing fine quality in the finished product, machine-generated lettering is required. Generally for most purposes, hand produced lettering is perfectly adequate and much quicker.

- iii) **Typing OHP material:** This is also a popular method of producing OHP transparencies. For this, instead of a standard office typewriter, bulletin or primary typewriter using a special ribbon or carbon sheet is used to type of material on to the acetate sheet. The second way is to type the material on to a paper and make a transparency from this by suing a thermal copier.

- iv) **From opaque originals :** We can also prepare an OHP transparency from opaque originals. By this method, good transparencies are produced, if the original material is suitable for OHP projection, by using a thermal copier or similar machine.
- v) **From computer-generated originals :** Today it has become possible to design and prepare OHP transparencies with the help of a computer. Now-a-days, MS-Power Point software is used to generate both plain and coloured transparencies which can be straight way taken from a computer printer.

You are able to provide gainful learning experiences to the students by using OHP displays according to the demands of the teaching-learning situations. There are three major display techniques by which you can display your still visual aids by using an OHP. These are:

- a) **Progressive disclosure:** This is one of the basic and most useful techniques from an instructional point of view. In this technique, the transparency is totally covered with the help of a paper, or pieces of paper like opaque material. You can reveal the portion progressively as the classroom teaching goes. This has the dual advantage of concentrating the mind of the learner on whatever item or section is being discussed, and retaining their interest by keeping them in suspense about the next point (a good psychological ploy). There are other modern and versatile methods of displaying this technique.

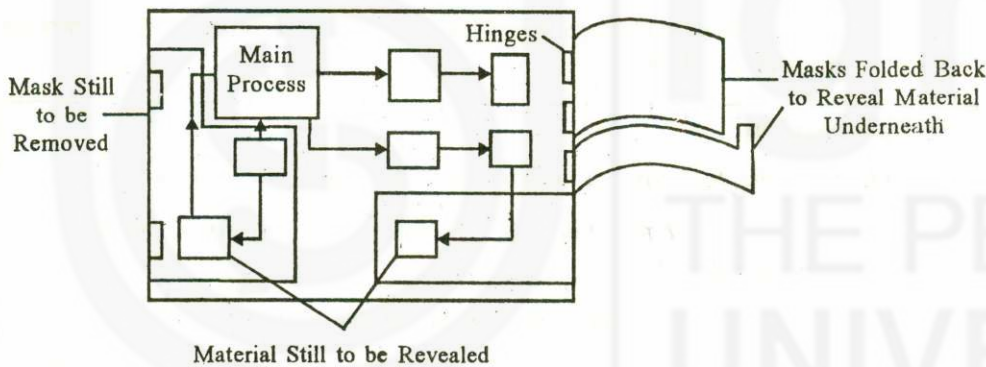


Figure 14: Use of a system of hinged masks to allow progressive disclosure of the various sections of a block diagram

We have also discussed progressive display of content structure under Unit 7 of this Block.

- b) **Use of overlays:** This is also a very useful method. In it, the whole transparency is displayed. As the teaching process progresses, other transparencies are placed over the first transparency. With the help of this technique, a complicated process can be explained in a very simple manner by superimposing transparencies. This technique is useful for explaining complicated processes/systems.
- c) **Use of animation:** An OHP is able to project animation to a certain extent. Ripple tank is one such example. It is made up of a transparent sheet. By placing this tank on the platen and projecting a light, characteristics of waves can be explained in a very simple way. In another way, special polarizing materials are placed on the platen.

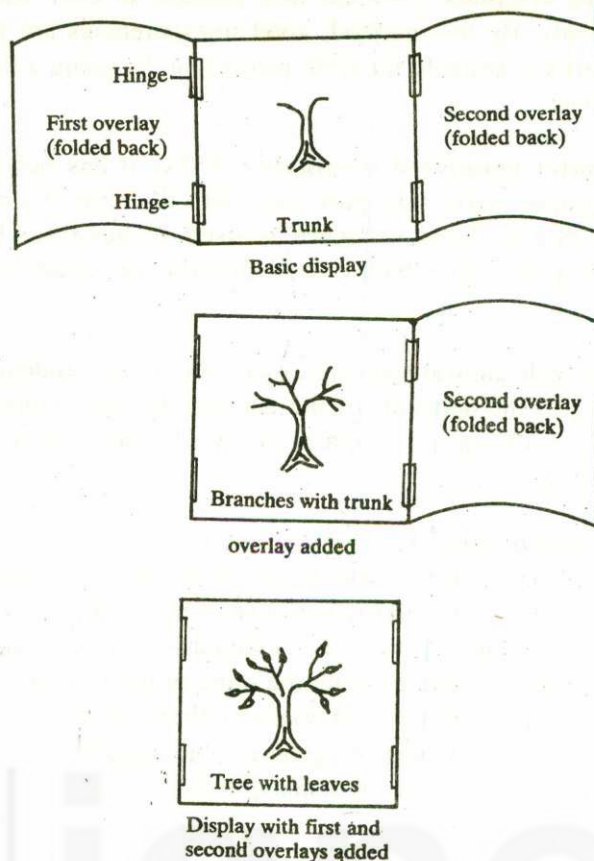


Figure 15: Use of a series of overlays to build up a progressively more detailed schematic diagram of a Tree

Self-assessment

6. Which of the following is untrue of slides but true of filmstrips?
 - a) They are used to project micro-specimens, diagrams, graphs, illustrations, etc.
 - b) They have a continuous movement on the screen.
 - c) They can be prepared by photographing objects, pictures, scenes, etc.
 - d) They can be prepared with the help of a computer.
7. Instructional Television can be used for:
 - a) Skill development
 - b) Emotional development
 - c) Intellectual development
 - d) Social development
 - e) All of the above.
8. Which of the following is not observed while using Overhead Projector?
 - a) Platen and head lens surfaces are kept clean and free from dust.
 - b) The screen is kept in one corner of the front corners of the classroom.
 - c) The lamp is switched on first and then the blower.
 - d) It should not be used for a long time.

9. Match the functions related to OHP in Col. A with the related concepts in Col. B. Each concept can be used more than once or not at all.

Col. A

(Function related to OHP)

- a) Superimposing of transparencies disclosure
- b) Teaching of mathematics
- c) Revealing teaching points gradually
- d) Progressive display of schematic diagrams

Col. B

(Related concepts)

- i) Progressive
- ii) Continuous recall
- iii) Use of overlays
- iv) Software in OHP

Computer and computer-assisted instruction learning

Though most of us have no access to the use of computer in instruction at present, the future years must certainly see the massive use of computer in instruction. As a communication aid, it has a lot of potentialities which can be exploited for instructional purposes, especially in the field of individualized instruction. As teachers, we must know the role of computers in the teaching-learning process. A computer can record, analyze and react to students' responses, it can store and manipulate information on an extensive scale, it can control and manage a wide variety of learning materials; and it can simultaneously cope with the learning requirements of many individuals. It can make a number of planning decisions also.

Technical description of a computer

A computer is an electronic device that accepts data, performs operations on that data in a sequence (decided by a programme) and outputs the results. Computers can be of various sizes and termed differently like mainframe computers, mini-computers and microcomputers. Apart from size, computers are differentiated according to specifications of the electronic devices. These include the amount and type of storage, the capabilities of the Central Processing Unit and the type and nature of the peripheral equipment (such as disc storage) that can be connected to the computer.

The basic microcomputer system as shown in figure 13 consists of an input device (e.g., the keyboard), the Central Processing Unit of the computer and storage devices (e.g. Cassette tape player, floppy disc device, CD-rom device), and the output device (e.g., a T.V. display Unit or a monitor and/or printing terminals). The actual equipment of the computer system is called the Hardware, while the term Software refers to the instructions or the programmes that, the computer carries out.

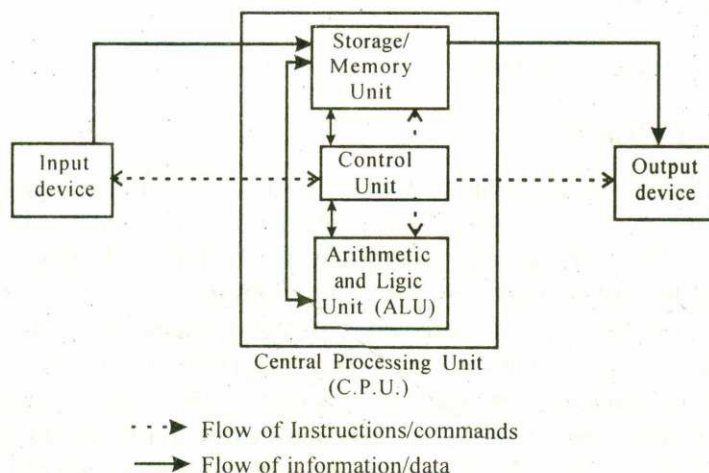


Figure 16: Microcomputer system

Source: S. S. Kulkarni, (1986) *Introduction to Educational Technology*. Bombay: Oxford IBH Publishing Co., P. 402.

The input device, usually a key board, (or cassette recorder or disc device), is meant to send data and instructions to the Central Processing Unit. The control unit in the CPU receives the instructions involving calculation or comparison. It then controls the movement of data from the memory to ALU for the arithmetic or logical operations. Once these operations are over, it moves the results to a specified storage location and/or to the output device. Normally, a television screen displays the work that the computer has done. A printer can also be used if a hard copy is required.

Role of computer in instruction

Computer has several applications in instructional situations. It is used to find the entry level of students' knowledge on enrolment. It is also used to plan and print individualized programs, monitor student's progress and compile tests and scores. But the most important contribution of computer in the domain of instruction is Computer-Assisted Instruction (CAI) and Computer-managed Instruction (CMI). We have already introduced to you Computer-Assisted Instruction in Unit 3 of Block-1. Here, we would let you know the different modes of computer-assisted instruction and their advantages and disadvantages.

Computer-assisted instruction/learning (CAI/CAL)

In computer-assisted instruction, there is flow of information and interaction between the computer and the learner. The computer delivers instruction directly to students and allows them to interact with it through the lessons programmed in the system. Computer provides feedback to the learner on the basis of his/her performance. On the whole, it may be said, that the computer acts as a teacher to the student.

The scope of CAL includes a wide variety of functions. These functions are usually realized in terms of a limited number of CAL modes. The major modes of CAL can be noted as follows:

1. Drill and Practice
2. Tutorial
3. Dialogue/Conversational
4. Games
5. Simulation
6. Databases
7. Narrative/Presentational

Drill and Practice

Drill and Practice is the simplest form of CAL. A series of exercises is presented to a student by the computer. The student gives a response. The response is processed by the computer and accordingly new activity is designed. Exercises can be created by the computer by avoiding repetition. The items can be selected randomly from the list and presented. Sometimes the series is presented as it is. Also endless exercise can be provided. As a response to the exercise, the programme either asks the student to try again till it is right or provides a chance or just states the right answer. The responses are also analysed to mark the success or to assert the need of more study. The question in the drill and practice are of these types: fill in the blanks, which is the odd man out, correct or wrong, answer in a word sentence, multiple choice. Activities like drawing, measuring and arranging objects are also possible on computer. Generally, typing of long answers is avoided in CAL.

In tutorial the topic to be studied is divided into a sequence of short sections called frames. It bears a close resemblance to the programmed learning sequences found in print and in teaching machines in 1960's. The programmed text presets a number of problems, particularly in determining whether the student has really mastered the current step and in deciding how to branch to the next step. The computer can be used to determine students' needs and preferences and to decide how to branch through material. The material can be more complex without adding to the students' burden. Thus in the field of branching, the computer opens up a range of possible branching which would have been difficult to arrange in the scrambled text or primitive teaching machine. The computer can be programmed to branch any number of alternative pages in text where there are many different routes. In tutorial, each learner can be diagnosed at every small stage and be led to a new path according to his/her need.

Conversation or Dialogue

These are based on the teaching learning method used by 'Socrates'. Both the teacher and the learner take an initiative to start the teaching-learning process. They can ask each other questions and answer them. These types of tutorials are based upon models of teaching-learning process and require very complicated and time-consuming programming. Hence, writing most of these systems are research laboratory work and they are not widely used. Also these are not practically cost-effective instruction systems.

In dialogue tutorials the computer is engaged in learning about the learner. Thus they try to improve and further individualise the instructional strategy being used. Deep questioning techniques and multifaceted analyses of the responses given by the student can help in building complex interactive dialogues.

Games

The modes discussed earlier provide information in a structured way, according to rules specified by the author. Gaming involved with a dimension of competition motivates learners to approach the given situation with enthusiasm. If learning concepts are taught or given for practice through games, learners generally tend to stick to it regardless of the time it consumes. Video games as well as computer games, without any educational input, are very popular with children who have access to a computer. If they are provided with instructional games, they will certainly acquire new concepts and skills.

Simulation

A few real life systems and phenomena cannot be directly learnt. The experiments may be time-consuming, expensive, difficult or sometimes dangerous too (e.g. fission of atom).

Computer can be used to simulate a real life system by following a set of rules, which approximate the behaviour of the real system. The rules specified for simulation may be simple or complex and quality of approximation can be governed. Various levels of approximation can be provided in the same simulation courseware. It allows effects of increasing experimental error or to give a feeling for the accuracy of the simulation. Simulation offers flexibility and control. In simulation, the particular feature of the computer as an ultra rapid calculating and data processing machine is used to its best advantage.

Simulation can provide the following advantages:

- It avoids the difficulties and complexities of real by using idealized conditions. e.g. changing demands and supplies of commodities to see its effect on the market economy.

- It overcomes the prohibitive costs of laboratory or field-work based experiments. e.g. providing variety of acids with different densities in a lab for one single experiment.
- The time normally demanded by an experiment can be shortened.
- Dangerous experiments can be experienced in safety, e.g. increasing proportion of pollutants in the environment to see the consequences.
- Experiment, which would normally be impractical, can be attempted e.g. creation of civilization on a different planet.
- The level of complexity can be increased slowly. Variables can be added at every stage.

Databases

One of the modes of learning is learning through exploration of resource material and library utilization. The power of a computer to store, retrieve and process information is used to help the student as s/he browses through the material. One can respond to the questions about the related information and retrieve an item which one needed, summarise statistical data, suggest possible times of investigation that may be of interest.

As in the library a book or a resource material can be found using subject code, author index or title index. One can provide such key words to the computer to find resource material. Unlike books, material stored in a main-frame computer can be made available at all the terminals at a time.

Narrative/presentational

Here the computer screen is used to present material to the student in a form sometimes referred to as an electronic blackboard. Along with normal verbal approach, movement and animation can be used with colours and music. Simple presentations can easily be developed by teachers to introduce learners to a new information. e.g. a teacher can develop slide shows using MS-Power Point or even develop web-pages using Front-page.

Advantages of CAL

The learning process could be strengthened more in many ways through these modes. Advantages of the CAL approach are mentioned below:

- CAL is individualized, that is each student is free to work at his/her own pace, totally unaffected by the performance of any other students. Since it can provide a method of instruction designed for self-directive study, it helps in improving skills or achieving objectives at all difficulty levels.
- Information is presented in a structured form. It proves useful in the study of a subject where there is a hierarchy of facts and rules.
- CAL forces active participation on the part of the student, which contrasts with the more passive role in reading a book or attending a lecture.
- Partly as a result of interactive student participation, it provides immediate feedback. The feedback may be remedial in nature or may direct the student to a certain path depending on its response.
- CAL utilizes a reporting system that provides the student with a clear picture of his progress. Thus students can identify the subject areas in which they have improved and in which they need improve.

- By enabling students to manipulate concepts directly, and explore the results of such manipulation, it reduces the time taken to comprehend difficult concepts.
- CAL also saves the unauthentic labour of teachers as well as students. Teachers need not waste their time and labour in arranging same instructional experiences, forming questions for every student, evaluating them at every learning stage, as all these are carried out by the computer programme.
- CAL offers a wide range of experience that are otherwise not available to the student. It works as multimedia providing audio as well as visual inputs. It enables the student to understand concepts clearly with the use of stimulating techniques such as animation, blinking, graphical displays, etc.
- Where a conventional practical demonstration is extremely difficult, impossible or dangerous, where the apparatus is not readily available, when a real situation would take an impossibly long time to investigate or where manipulation of different variables may prove useful, simulation is of tremendous significance.

Also a series of responses may be provided where some are better than others, with each response providing feedback on each of the options.

- CAL provides a lot of drilling which can prove useful for low aptitude students and through which high-aptitude students can be escaped.
- CAL can enhance reasoning and decision-making abilities.
- Students who use CAL become increasingly self-directed in their learning style. They become more responsible for learning and less dependent on teachers. They consider themselves capable learners.

Limitations of CAL

Though CAL has a number of advantages, it has some limitations also. Some of these are as follows:

- A CAL package may be regarded simply as a novelty, rather than an integral part of the educational process. It may threaten the objectives of the package.
- Though simulation permits execution of chemical and biological experiments, hands-on experience is missing. Moreover, CAL packages cannot develop manual skills such as handling an apparatus, working with a machine, etc.
- There are real costs associated with the development of CAL systems. It is expensive in terms of staff time to devise and programme effective CAL.
- Content covered by a certain CAL package may become outdated. A very high cost is involved in the development of these packages. If the course is outdated, the resources involved in its development will be a waste.

Problems related to the use of CAL approach

- Motivating and training teachers to make use of computers in education is a challenging task. They may have fear of this new device. They may be unwilling to spend extra time for preparation, selection and use of CAL packages. It may also be perceived as a threat to their job.
- CAL packages may not fulfil expectations of teachers. Objectives and methods decided by the CAL author and of a teacher may differ.
- There are administrative problems associated with computer installation. The problems particularly related to the physical location of the computer resources, the cost of hardware maintenance and insurance and time-tabling.

- Quality courseware demands a team approach. Expertise required for developmental process is from different fields such as teaching, programming, hardware engineering, subject expertise, etc. they may face problems in coming together for a long time.

The rapid development of hardware makes it difficult to select a system before it becomes obsolete. If a new system is installed by a maximum number of institutions, they may not get courseware required for the system and courseware developed so far may become useless.

To overcome many of the problems related to CAL a lot of educational software has to be developed. A number of such software is being prepared by experts in various fields. For their wider use, they should be validated.

Self-assessment

10. What are the instructional applications of computer.

Integration of communication aids with interaction techniques

Communication aids can be very well integrated with different interaction techniques. These may be lecture or group interaction techniques like seminar, symposium, debate, panel discussion, buzz session, brain storming, simulation, etc. for example, OHP can be a very good aid in seminar and other interaction sessions. Non-projected techniques like graphs, charts, diagrams, pictures and be integrated with interaction sessions. Video Films, and tape-recorder can be used in different interactions.

Improvisation of teaching aids

The teacher should develop teaching aids out of cheap and easily available materials. He should use his ingenuity in thinking of making use of objects available in the classroom even while the lecture is in progress. For example, use of walls, edges and corners in a class for three dimensional geometry, light and shadows to illustrate projection of three dimensional objects on a two dimensional plane.

Let us sum up

This unit has focused on some commonly used communication aids as well as some newer educational technologies which will be used in the future. In beginning, the need of communication aids in the teaching-learning process was highlighted which was followed by broad classification of communication aids on the basis of the sense they stimulate. Then, an overview of some non-projected and projected communication aids and on how to use them in classroom teaching have been presented.

Though blackboard/chalkboard seems to be very common, using it involves so many skills ranging from holding a piece of chalk to using graphic materials on the chalkboard. A teacher must also learn how to prepare and use charts, posters and models for instructional purposes.

Under skills of using projected technique, how to use slides, filmstrips, OHP, computer was stressed upon. Different ways of preparing slides and filmstrips were discussed. Knowledge of hardware aspect of OHP is as important as preparing the transparencies and using them for classroom teaching. Every teacher is expected to learn about the use of computer for classroom instruction, and the future years

may witness teaching at all levels increasingly computerised. Among the instructional uses, CAL discussed. We also discussed in details various modes of CAL and their advantages and disadvantages.

Unit-end activities

1. Choose a topic from your own discipline. Identify the instructional points which can be communicated through charts or posters or models. Prepare and utilise them while delivering your lecture.
2. Visit the computer training centres in your city/university. Find out what training packages they have. Also visit your library and find the journals on computer (e.g. BYTE). Many of these will give you information on the latest changes that are happening in this field.

Points for discussion

1. Most of the emerging media e.g. computer, video disc, etc., enable individualised instruction. What are some of the reasons for this emphasis on individualising the instruction?
2. Which of the aids/media discussed in this Unit can be used in the distance learning mode? How?

Suggested readings

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Laurillard, Diana (1987). The Problems and Possibilities of Interactive Video in the Computer Revolution in Education (ed.) by Jones, A et. al., Sussex: The Harvest Press Limited, Pp 127-129.

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Answers to self-assessment

1. Communication aids help both teacher and students to achieve the pre-determined instruction objectives and enhance the effectiveness of classroom instruction.
2. A chalkboard is used for a number of purposes. It is used to display subject matter of a lecture. Specific items like diagrams, tables, maps, etc., and impromptu materials like words, equations etc., can also be displayed on a chalkboard. Chalkboards are also made use of for displaying ideas generated by brainstorming group, buzz groups, experimental results, solution to tutorial exercises and so on.
3. a) Left, b) standard surface, c) impromptu.
4. Flip Charts consist of large sheets of paper, fixed to a supporting rod or clip along their top edges.

5. i) c, ii) d, iii) e, iv) a, v) b, vi) d, vii) c.
6. b.
7. e.
8. c.
9. a) iv, b) iii, c) ii, d) i.
10. There are two major instructional applications of computer. One is, computer-assisted instruction and the other is, computer-managed instruction. In computer-assisted instruction, the computer provides the lesson to the learners interacts with them, gets responses from them and provides feedback to them. On the other hand, in computer-managed instruction, the computer gathers, stores and manages information to guide students through individualised learning experiences.



Emerging Communication and Information Technologies

10

Introduction

Advancements in communication and information technology (C-IT) have contributed to the overall development of people across the world. Now, everybody talks about the communication and information technology revolution, the role it is playing and also it is going to play in the future. You will agree with us that many of the functions performed by the human beings could be replaced by electronic equipment (Halal, 1992). The emerging communication and information technologies are gradually covering the entire span of human activity. You might have come across many expressions, such as electronic shopping, education, banking, trading, political polling and voting, home entertainment, TV networks, medical treatment and so on. The new option of interacting globally is beginning to dramatically alter the world of works. Multinational corporations are now able to conduct their business activities around the world with ease. The potential of emerging technologies can be judged by the fact that a large sum of money, time, creativity and efforts have been poured in communication and information technology industry.

Education, no doubt, has been benefited by communication and information technologies in various ways and at various levels. From both the sociological and the economic points of view, communication and information technology has made an impact on education and training. A number of institutions in the developed countries are offering courses through various communication technologies such as interactive TV, computer conferencing, internet and other modern media. Some distance education/open learning institutions in the developing countries are also now offering courses electronically. As a result, a chunk of learners have opted to pursue their study through communication and information technology: both the popular and modern media.

In this unit, we shall discuss the essential features, role and applications of modern or emerging communication and information technologies in the educational process. However, the emphasis in this unit is laid on those technologies which have strong bearing on education: conventional as well as distance/open learning situations. The creation or adoption of new technologies and their applications is evolutionary in many forms. Some of the technologies discussed in this unit may not be popular in education these days in the country. Nevertheless, in the changed scenario there is every possibility that today's students would look for more sources of information, thus tapping the potential of new technologies, as per their needs and requirements. Keeping the potential of the various technologies in views, we shall discuss three major technologies in this unit. They are audio-video technology, computer technology, and telecommunications and networks. These technologies are not mutually exclusive. Their applications overlap each other's domain. Before discussing different types



of technologies, we shall try to give you an overall picture of emerging technologies and their perceived impact on education and training.

Experience has revealed that the communication and information technology strengthens the hands of the teacher, makes his/her teaching more effective. But remember that it is pedagogy, and not the technology, that is important. Technology in the classroom does not automatically guarantee better results for students unless it is planned, designed and implemented creatively/effectively. Technology should be studied and adopted to take full advantage of its capabilities. You, therefore, should look for new ways of teaching the use of technology. You can also try to utilise some existing or emerging technologies in your teaching and assess their pedagogic effectiveness in your classroom.

Learning outcomes

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

- discuss the role of emerging communication and information technologies in the changing scenario of the teaching-learning process;
- discuss the nature and essential features of different emerging technologies in the field of education; and
- explain the role and uses of various technologies in a variety of teaching-learning situations.

Future trends: emerging technologies in education

The new communication and information technologies have profoundly affected our social structure. There is a growing interdependence between technology, information (message) and society. At the policy level the use of communication technologies in education and training has been identified emphatically. The CABE (Central Advisory Board of Education) Committee on Distance Education (1994) recommended the urgent need for the use of electronic media in the educational process in view of its vital importance, particularly to support open distance education. It also recommended undertaking some experiments with new technological systems/developments, with an eye on the future and in keeping with the technical expertise and advanced infrastructure available in the country.

Convergence of emerging communication and information technologies is taking place these days, thus maximising the strengths of individual technology. Telecommunication clubbed with computer technology has revolutionised the area of human communication. The capability to exchange information on a global basis is possible through a powerful communication tool; the satellite. Computer technology has provided tremendous capacity to store and exchange information. The human-computer interface has made communication further efficient, in terms of cost, time and reliability. This is the reason why communication technologies are becoming popular in receiving and transmitting messages, data, voice and images.

The computer and telecommunication technologies are not leaving the education sector untouched. These are enabling the teachers to develop multimedia in which text, voice, pictures, stimulation, etc. can be integrated and delivered through computers as an interactive learning package. The technologies will enable us to develop what are often called virtual classrooms, virtual universities, virtual conferencing, virtual laboratories, etc. (Takwale, 1995) wherein C-IT will create learning environment suited to the needs of the learners.

Emerging technologies appear to offer the opportunity to gain access to knowledge and skills required in real life. This would lead us to a learning society where

learning is a continuous process throughout life. This is a single new development that can revolutionise the future of education. Virtual reality and simulation will provide the ability for us to enjoy experience that we could not get otherwise. This is an experience without risks and promotes learning in a new way. So, communication technology will provide a new strategy for education, for training experience. We are not talking about the technologically developed countries only, virtual classrooms or institutions are now getting established in the developing countries also, like Thailand, Malaysia, India, etc.

To compete and survive in the competitive world of education it is essential to create, adopt and utilise new technologies, which will allow efficient flow of data, voice and images to all those who want to remain updated in the fast changing world. With the help of new communication and information technologies, education will cross the country's border and will change the world into a 'global village'.

New technology almost always addresses the changing paradigms of education and training. It changes the way the teacher teaches and students learn and do their work. It provides them new tools to increase the productivity in terms of learning outcomes. It makes learning easier, more effective and more enjoyable. In brief, technology brings the following main changes (Hathawy, 1990):

- **Teacher's work:** A shift from the role of the sole dispenser of knowledge to students to one of helping students acquire knowledge from a variety of sources will be clearly visible once new technologies are used. Appropriate use of technology in education necessitates changes in the way teachers organise and implement teaching activities and students engage in learning activities.
- **Treatment of students:** New technologies can provide more individualised learning to the students in terms of content, length and time.
- **Facility design:** Appropriate applications of technology in education may alter the requirements of facilities. Educational practice may opt technologically - enhanced learning approaches. Educational facility designs can provide greater flexibility in using learning materials, provide for better student access to a variety of information sources within and outside the school and be accessible for a greater period of time.
- **Productivity:** Technology - enabled learning system can both increase productivity and provide products for export i.e. courseware developed could be marketed. Productivity is measured in terms of both quantity and quality, more and better.

The point we want to bring home is that potential of technology must be explained. Technology can be used to alter the way things are done in education. When technology is used to alter the way education is delivered, a number of benefits should accrue, as mentioned above. It is worth to mention here that we should try and understand how technology can be used effectively in education and determine the right roles for teachers and the right role for technology.

Audio-video technology

As this unit deals with emerging communication and information technologies, we did not include popular educational media: radio and television etc. in our discussion. However, innovative applications of radio and television in teaching and learning are included.

Interactive broadcasting

As you know, the broadcasting mode, both radio and TV, is being used for education at the primary, secondary and higher education level in the country for a long time.

However, the delivery of information has remained unilateral (one-way) only. The ability to interact is a key feature of face-to-face teaching. It is, therefore, important to decide what actual or equivalent levels of interaction are possible in other forms of delivery of information i.e., in distance and open learning system. One of the main characteristics of emerging media is the potential for interaction. Now, efforts are being made to make the broadcasts interactive i.e., two-way communication. The students, though physically separated from the teacher and the institution, can not only hear him but also clarify their doubts, ask questions or raise queries. You might have seen various radio programmes (usually known as phone-in-programmes) in which the experts answered the question (s) asked by the listeners. Radio is a mass medium and is being made more interactive. The listeners participate in the interactive broadcast through phone-in system. IGNOU is also using interactive radio broadcast for tele-teaching.

Satellite radio

Satellite radio will overcome the limitation of FM radio which has limited reach. This technology is coming to India at a fast rate with over a dozen channels already on air. The key components of the satellite radio systems are satellite, ground repeaters, and radio receives. The broadcast uplink their signals to the satellite through a centralised hub or feeder link station located within the global uplink beam. The satellite then transmits the signals which are picked up by receivers on the ground through a detachable antenna (Sharma, 2003). Satellite radio started in US in 1992 when some agencies started broadcasting satellite-based digital audio-radio service with a global network. All India Radio has launched its own satellite channel aimed at non-resident Indian across the globe. AIR has plans to add more satellite channels for the global market.

Besides, some limitations such as costs involved, centralised transmission, requirement of an antenna to receive signals, etc., the satellite radio is a potential tool for sharing information, organising tutorials/counselling sessions, giving guidance to international students. With prices going down, popularity of satellite radio may go up.

Computer technology

The major communication technologies: print, audio and video, are converging today at the computer, a fact which stirs excitement among educators who imagine their students as users. The convergence of these media makes the learners more than users, it invites them to be managers or controllers of a large body of information that is easily available on a computer. We shall discuss in brief, the various computer-based technologies available for educational purposes in the following sub-sections.

Computer

A significant benefit offered by the computer technology is the ease and speed with which it can manage the learning process. The computer, therefore, is a useful tool for education and training. The technology will exert even greater influence on education in future. Computer technology can perform the functions of a classroom technology. It can be used for a variety of instruction/purposes: individual instruction, simulation, gaming, home studies and independent learning. It is easy for both the teachers and the students to understand difficult and abstract educational concepts by computer animation, graphics and colour combinations.

Now developments have resulted in widespread usage of computers for information access, education, training and communication. A study conducted in USA concluded that computer-based tools could reduce the time to learn by 30 percent. The finding is based on defence training, but this may provide indication of the potential benefits for general education.

Virtual Education

Now-a-days newer approaches to teaching and learning are being tried by various institutions in the country. These concepts are known by various expressions such as, virtual classroom (Heltz, 1990), learning circles (Reil, 1990), online education (Harasim, 1990), networked learning, etc. Virtual education aims at providing computer generated virtual environment which can be used as the most advanced tool of visualisation for a large number of scientific applications such as study of computer structures, near realistic simulation of natural phenomenon and conducting hazardous experiments. The student can interact with a life-like artificial world that can be perceived, explored and manipulated at will. The various objects in the artificial world created by the computer behave in the same manner as the objects in the real world. In real life we perceive objects by our senses: seeing, hearing, touching, tasting or smelling. In virtual reality, computers are used for creating visual environment, audio environment and tactile environment for taking care of input to the three senses. Computers create images by using advanced graphics techniques. The virtual education is a tool of human being-machine interaction which is going to revolutionise education and training.

‘Virtual means in effect but not in fact’ (Tiffin & Rajasingham, 1995). As the technology grows, virtual education will become realistic as it (technology) brings sound, visuals and interactivity together and hence create a learning environment any where in the world. The combination of various technologies can provide at a reasonable cost an effective virtual classroom (i.e. one in which all students and teachers present in the same room) in a form which allows not only the use of traditional methods of teaching – learning (eg. lecture, question-answer or group discussion) but also new capabilities largely as teachers or students prefer (Maly, K. Overstreet, Abdel – Wahab & Gupta, 1994).

‘Virtual education has emerged from the application of C-IT in the context of distance education, however, it has now developed to the point where it can be used to support classroom-based learning as well as distance education’ (Col, 2003). ‘Virtual institutions will develop on education-on-demand system for delivering tele-courses to home personal computers. While each student would work independently, computer confereing, e-mail and voice mail access to a faculty or advisor would be available to answer questions, evaluate assignments and provide guidance ‘ (Salvati, 1995). In this multimedia virtual environment teachers can design individualised instruction for students who can learn in real –time or on demand.

IGNOU has launched some programmes through virtual campus; on-line delivery through tele-learning centres. Tamil Nadu has established first virtual university in the country. Other state universities may also use virtual learning centres for imparting quality education to those who are connected electronically with the university.

Videodisc

The videodisc is a product of the optical disc family. It has tremendous capacity to store information, data, visuals and voice. Videodiscs have been adopted by libraries, researchers and colleges for storage of information. A videodisc can store thousand of still visuals, data and information. A videodisc player makes it possible to view a single picture (also known as frame) for the time required by the student. The videodisc player reads the same frame where the image/picture is stored.

A videodisc player can be interfaced with a computer to create an interactive environment. The advantages of videodisc are summarised as follows:

- Videodisc is a flexible medium giving control to study paths, access at any point in the programme, and feedback as required.
- Random access.

- Information read without physical contact giving exceptional durability.
- Permit rapid, almost instantaneous, access to various segment to a programme.
- Good display quality.
- Slow motion and reverse display.
- Each frame identified by frame number.
- Superior freeze-frame viewing.

Videodiscs have certain limitations too. Important among them are as follows:

- Comparatively high costs usually associated with production.
- Most videodiscs are a fixed medium – can be neither recorded nor edited using standard video production facilities.
- Unfamiliar to most teachers and teacher educators, consequently there are limited applications in Indian context.

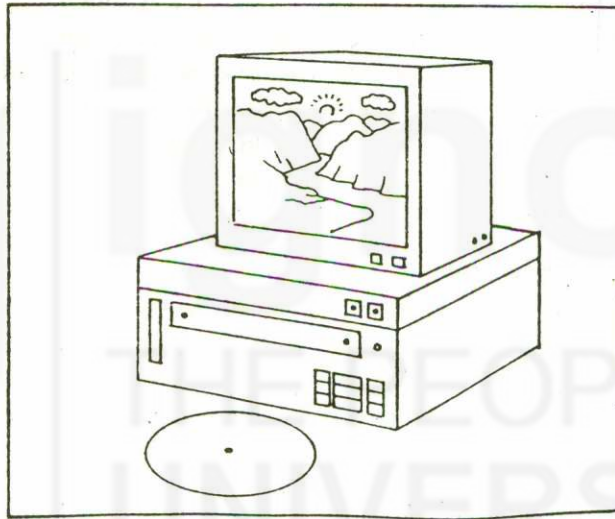


Figure 1: Videodisc

Compact disc-interactive (CD-I): CD-I is an optical storage system primarily geared to educational markets. It is a sophisticated audio-video tool that supports a variety of playback format. CD-I can also support animation, video and photographic quality images.

CD-I is an interactive tool. A student can interact with the database of information through CD-I player and remote control device. Instead of watching and listening to a pre-arranged presentation, much like a video tape, the student can select the information he wants to hear and see the order in which it is to be played (Mirabito, 1994). Based upon the student's needs and requests the computer would retrieve and display specific information stored on the interactive disc.

Uniqueness: The combination of the two technologies (its functionality and use, and the enabling technology) provides a medium which has the potential for providing unique educational materials as adjuncts to the teaching and learning process. Well designed programmes can effectively enhance the learning process. This is achieved through the active participation of the learner and the level of visual realism through simulation and surrogacy.

As an educational tool it has been enthusiastically received by learners and is clearly enjoyable to use, but it has not yet proved to be cost effective and evaluation of its educational benefits is to be assessed.

Evidence of effectiveness: In the educational context, it is far easier to find evidence of an enthusiastic response to the medium than to find hard evidence of its effectiveness following an objective and carefully executed evaluation. In the training context, there is no doubt that it is highly effective in improving retention compared to other forms of instruction in appropriately chosen topics.

There is also no doubt that CD-I has the attributes required for providing the most effective types of learning environments, and that potentially it is an effective adjunct to conventional teaching. Like all new educational technology products, there is a pressing need for evaluation of the effectiveness of CD-I programmes before their widespread introduction into the curriculum. Evaluation, however, requires substantial time and resources if anything more than an informal survey of attitudes is to be attempted.

CD-I has many characteristics. Some important ones are summarised below:

Versatility: CD-I is an extremely versatile medium. In one application it may serve as a pictorial database for a museum collection of photographs held as video stills and, in another, enable managers to take part in a realistic simulation game. It can serve as an entertainment source by giving access to a selection of videos, or it might serve as a training programme for motor vehicle mechanics, for example.

CD-I is at its most powerful when operating in a simulation mode. This may take the form of a dialogue with a teacher, a realistic representation or surrogate travel, the conducting of an experiment, the management of a commercial or business venture or the manipulation of real equipment interfaced to the CD-I system. The great advantage of the higher levels of functionality is that the education lists can teach the student, for example, how to be a physicist, a traveller, a manager, or welder, not merely what physics, travelling, management and welding are about.

Views of CD-I: As a medium, CD-I may also carry a range of quite different applications. It is, consequently, not surprising to discover that interactive video means different things to different people. It may be seen as a totally new creative medium by video producers, or as video-enhanced computer assisted learning (CAL) by educationists, or abstractly as one component of a multi-media information system by computer scientists. Each of these views is valid, so that evaluation of interactive video in a general sense are of little use unless considered in terms of some particular form, functionality and application.

For the educationist, it provides a potentially richer learning environment for the learner giving all the control to him including access to an extensive audio-visual library held in video form.

Speech recognition: Speech recognition is an innovation in communication technology. This feature allows a computer to recognize human speech or words. It translates the spoken words into information and makes it easier for people to do their job and learn. Some research and development activities are going on in developed countries to use this capability of computer technology for educational purposes. The student can instruct the computer to perform an operation instead of relying on the keyboard or other interface for inputting instruction. The system initially diagnoses the voice of the user and then it recognises various words before the assigned instruction is carried out. This language processing system has provision to differentiate certain words, having similar pronunciation. The system simplifies various operations and help the student simultaneously perform more than one task. Thus, speech recognition system is a very natural interface since it employs one of

our most common communication tools, i.e. speech. The systems could recognise the student and could reply by means of the stored speech, where a number of phrases are recorded separately and then assembled into meaningful sentences.

Some agencies in developed countries are engaged in research and development activities related to speech recognition. Conversation computer systems are being developed.

The technology could be very useful for visually challenged students. The technology can be linked with an optical character recognition (OCR) system. An OCR can recognize text from publication and other printed documents. The information can subsequently be reproduced in computer-generated speech, thus making the material available to visually challenged students. In this way, human-computer interfaces become meaningful and productive for students with disability.

Electronic-mail (E-Mail)

E-mail has become quite popular all over the world. The business world has long since realised the advantages of this device, as it provides the facility called E-mail. D'Souza (1992) reported five essential advantages which e-mail has over traditional communication modes, as discovered by business institutions. They are:

- Reduced cost
- Reduced paper handling
- Faster computer
- Improved computer
- Integration of data computer with records management

E-mail is primarily a store and forward messaging service. The messages/data are sent and stored electronically into the user's small-box and remain waiting till they are retrieved. E-mail was computer, text-processing and communication tools to provide a high speed information exchange service. The e-mail utility on a computer system enables one computer-user to communicate with another user or a group of users via the user's terminal.

E-mail, unlike paper-based computer, is fast and can transmit information (mail as the term indicates) in seconds or minutes across a continent. Replies can flow back just as rapidly E-mail is text-based. Unlike fax or telephone, e-mail has no picture or sound component. Information can be conveyed only in the form of a text. That is like the normal postal mail, but unlike conversations, as the senders and the receivers do not attend to the communication act simultaneously. This communication through e-mail is asynchronous or non-simultaneous.

To be able to use the facility of e-mail, four main components are necessary. They are:

- A telephone line
- Computer (mainframe, mini or micro)
- A modem (equipment to convert whatever is typed into electronic signals)
- Communication software

One of the biggest advantages of e-mail service is its adaptability with regard to all kinds of data terminals like desk top or portable computers, fax, telex, visuals displays units, printers all of which can be utilised to send or retrieve data via e-mail. The confidentiality of the data is maintained as well as guaranteed delivery is possible as no one else can take data. Certain data can be further locked by use of additional passwords.

E-mail, as a new technology, has innovative instructional possibilities. Professor D'Souza's (1992) studies on the potential applications of e-mail in the academic settings have identified three broad areas where e-mail has proved or can prove quite effective. These are:

- **Pedagogy:** Through e-mail the students can have easy access to information resources which contribute to updating and greater learning. It has the capacity to present to the student many kinds of information sources. Moreover, e-mail can remove time and space barriers of the conventional classroom teaching. Sitting at home the teacher can respond to students' problems concerning assignments, projects or readings. It also provides one-to-one communication between the student and the teacher. Thus, it can offer more individualised attention to the students with specific learning needs.
- **Research:** With widespread computer networking among educational and research institutions, researchers can use e-mail to access data. They can exchange their research paper, proposals, formats, and so on quickly and conveniently. Thus, e-mail keeps them in touch with professional and experts and can enable them to access a variety of databases in almost any academic field in any part/institution of the country.
- **Administration:** As mentioned earlier, e-mail is being used for day-to-day computer, such as to receive or send messages at a convenient time, in a rapid, error-free and cost effective manner; read messages numerous times; save messages for future reference, etc. Mere speeding up the flow of existing information may be sufficient justification for using e-mail. The value of e-mail can be increased when coupled with other devices such as word processing, data-bases, etc.

As computer networks continue to grow and expand, domestic as well as international e-mail can be a valuable tool for communication, writing, research and routine administration.

Self-assessment

1. *What is meant by virtual reality?*
2. *Write any three advantages of videodisc.*
3. *What are the educational applications of E-mail?*

Telecommunications and networks

The concept of telecommunication has also been extended to the field of education, where learners can enrol for open learning/distance education courses and can interact with 'electronic' instructor/teacher. The learners can select textbooks and download and review course. Depending on the system, the teacher can be available for consultation during specified hours or through e-mail (Mirabito, 1994).

Telecommunication technologies are playing a significant role in dissemination of information and promoting education at a distance. We shall discuss some telecommunications technologies in this section.

Communication satellite

Satellite can be a sole distribution source but are often used in combination with other systems, including terrestrial links such as microwaves, cables and transmitters. Satellite distribution and the emerging technologies associated with it are increasing the number of people learning at a distance. But we should remember that the satellite should be used for what it does best, in terms of reaching remote students,

in terms of delivering learning materials that could not be sent to the students through other means, and allowing, as far as possible, for two-way communication between students and teachers and among students.

You might be aware of the experiment, popularly known as SITE (Satellite Instructional Television Experiment, 1975-76) in which satellite was extensively used to reach and teach, besides rural adults, primary school children living in the rural area: including remote locations and difficult terrain. Thereafter since 1982, INSAT (Indian National Satellite) is being used for education and development. Institutions such as NCERT, UGC, IGNOU produce educational TV programmes for broadcast on the national channel through INSAT.

Satellite technology can be used to provide two-way communication. In last one decade, the Indian Space Research Organisation (ISRO) conducted various experiments using satellite for two-way interactive communication between the teachers and the students. Two-way interactive communication through satellite, popularly known as teleconferencing (one-way video and two-way audio), has been operationalised in the country since February, 1995 with two teaching ends (uplink facilities at IGNOU Campus, New Delhi and the SAC, Ahmedabad) and more than one thousand learning ends scattered all over the country. The facility is being used by the various institutions for education and training at a distance. Due to wide coverage and round the clock availability of the satellite, it can cater to the educational and training needs of people, irrespective of the place of their location, age and creed.

With satellite-based communication and computer technology, education systems can not be monopolised by a few. Various experiments have been and are being conducted to establish satellite-based communication networks, paving the way for free flow of information inside and outside the country.

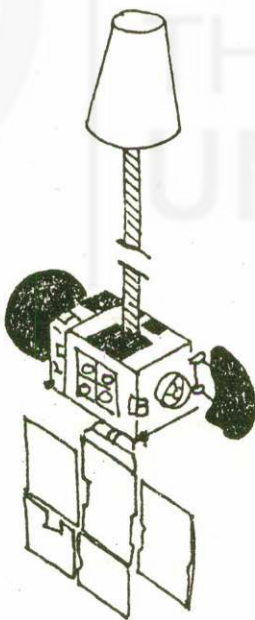


Figure 2: INSAT-1B Synchronous Orbit Satellite

Direct to home (DTH)

DTH television service will open up a new technology for TV viewers, including learners. It will empower TV homes, learning centres, university/college campuses with clear picture quality and digital sound. DTH will be more useful for scattered population and rural area where neither Cable TV nor Satellite down link facilities are available. DTH works through a table-fan sized satellite disc and a digital decoder

and a SIM Card. The disc will connect to a decoder which will link to the TV. DTH would be a viable alternative to cable TV. In coming years it is expected that DTH system would be more popular in the country. C-band DTH is already there in the country while Ku-band is seeking entry. Moreover, C-band has comparatively less capacity than Ku band in giving channels. DTH service on Ku band, if allowed, would distribute satellite TV channels directly to users using a small dish antenna, an integrated receiver decoder box with a 'smart-card'.



Teleconferencing

Technology is an umbrella term that describes an electronic link or meeting between participants at two or more locations. Unlike telephonic conversation which links two users, teleconferencing links more users located at different places through audio-video and/or computer technology. It is an important device of our overall communications system and is emerging as a valuable tool for education and business meetings.

Before we discuss the potential applications and types of teleconferencing, we would like to highlight the need for two-way communication technology. One of the most obvious markets for interactive technologies application is education. All educators agree that interaction is one of the effective ways of getting/giving feedback in the educational process. In other words, feedback (that is interaction between the teacher and the students) is an essential component of the teaching-learning process. The ability of the student to interact with both the learning materials and the teacher varies. Like face-to-face interaction, mediated-interaction also varies from one-to-one consultation between a teacher and a student to one-to-many i.e. between a teacher and classes or group(s). It is obvious that due to cost and accessibility to emerging technologies one-to-one interaction between the teacher and the student is expensive than one-to-many when queries raised by the students or answers given by the teachers are shared by large audience, classes or groups.

Teleconferencing provides a variety of advantages to teaching-learning at a distance or autonomous learning. It can be used for brain storming, questioning, role play, group discussion, case studies, problem-solving, etc. it can be used to keep the students and teachers informed of important developments and innovations in the body of knowledge. It can link various colleges/universities learning centres or homes with the main institution (teaching end) thus, can help teachers in providing quality education to member/participating higher education institutions or students. The guest lectures can be arranged through teleconferencing. The guest teacher can make live presentation and be able to 'electronically' meet the students in a classroom-like situation. Thus, teleconferencing makes it possible for the participating institutions or learning centres to draw upon the best resources and experts in the specific field of study, who may not be available to all institutions or students under normal circumstances.

Like any communication technology, the application of teleconferencing in the teaching-learning process will depend on the accessibility, cost and pedagogic effectiveness of the technological configuration being used. Nevertheless, if systematically designed, planned, implemented and utilised, the teleconferencing sessions can provide valuable resource to the students learning at a distance. We should remember that teleconferencing, for that matter any communication technology, will not eliminate all face-to-face contact, which is called for on different occasions. Depending on the nature of the knowledge or skills to be acquired by the students, an on-site contact may be appropriate. In this situation, the teacher (expert) can actually sit down with students, and make adjustment according to the need of their needs.

Besides facilitating education and training at a distance, teleconferencing can be used effectively for conducting business meetings, and managing and monitoring the various operations of an organisation/institution with multi-campus. It relieves the participants from the difficulties of travelling distant locations and saves enormous time and money for them.

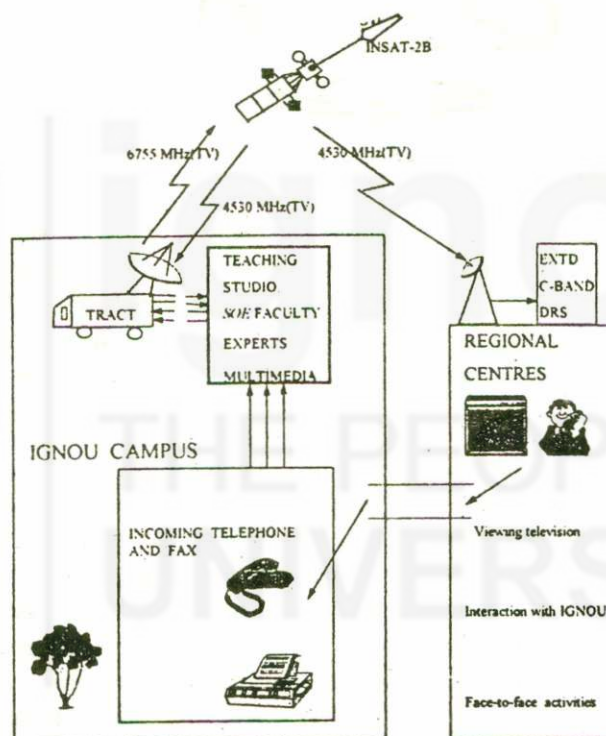


Figure 3: Teleconferencing programme of the School of Education, IGNOU

(Source: Menon, M.B. (1995) *Utilisation of New Technologies in Distance Education* (Report of project sponsored by Spencer Foundation, Chicago). School of Education, IGNOU, New Delhi).

There can be different types of teleconferencing, different types of technological configurations. For your purpose we discuss three types of teleconferencing system being used in India these days. They are:

- Audio teleconferencing
- Video teleconferencing
- Computer teleconferencing

These types have been classified according to the use of the technological configuration. Let us discuss each type in detail.

Audio conferencing: An audio conferencing can be thought of as an extended telephone conversation, but instead of talking with only one person, you may be talking with several or more students, located at multiple sites (schools). Audio conference is a convenient way to bring people from diverse locations together to participate in effective discussions. An audio conferencing is an effective communications tool for sharing information/ideas/experiences and is inexpensive to design and implement. An audio conferencing can be used for various purposes. It can create an inexpensive communications link between a physical education class and a sports reporter on the play ground or a medical science class and an operation theatre in a hospital which may be far off from the college or the students.

In audio conferencing the students can hear the teacher and ask questions through the same system, i.e., audio. Neither the teacher nor the students can see each other. Moreover, the motivated students are likely to be benefited more or they would actively participate in the discussion. The teacher, therefore, has an important role to play in creating a favourable learning environment and sustain the motivation of the students. The level and quality of language used by the teacher also determine the effectiveness of the system. In a developing country, like India, audio conferencing can prove to be an effective means of distance learning.

Audio conferencing has certain limitations too. Being an audio medium, it is a unisensory medium, i.e., it involves learning through listening only. It may not be useful for teaching those topics which require visual support such as movement of a process, demonstration of a skill, colour of an object, etc. This limitation, however, can be overcome to some extent by backing up the teaching with the printed text such as workbooks, diagrams, handbooks, manual, etc., and supporting on the backing materials in the teleconferencing sessions. The teacher can refer to the diagrams, etc., in his/her presentation and in turn the students on the backing materials in the teleconferencing sessions. The teacher can refer to the diagrams, etc., in his/her presentation and in turn the students can ask questions or seek clarification on them (diagrams, etc.). In this way, the teacher can guide/direct the students to conduct experiments at the learning centre or home (of course with the help of science kits available with the students) through real-time interaction.

Video conferencing: As the term indicates, in this system students can see the teacher or both the teacher and the students can see each other. Depending on the use of technology, there can be two types of video teleconferencing. They are:

- Two-way video conferencing
- One-way video conferencing

Let us discuss each type in the following paragraphs.

- i) **Two-way video conferencing:** Two-way video conferencing is a teleconference where, as implied by the name, video or visual information is exchanged. In the two-way video conferencing one can see and hear the teacher and fellow students located at different learning centres, and can learn in an interactive environment and exchange views/ideas. A primary advantage of the two-way video conferencing lies in its replication of a face-to-face meeting. Students can react to each other's body language and visual clues in interpersonal transactions. A two-way video conferencing can accommodate a range of information, including graphics and possibly scanned documents.

The video conferencing can be either motion or non-motion operations. The term motion implies that teachers can appear on television screen in a life-like manner. It can range from full motions, where transmission may look like conventional broadcast television, to limited motion, where movements may be jerky and there is a deterioration in the picture quality. The non-motion or freeze-frame video conferencing, the second category, consists of a series of

still images that appear on the screen. Even though the visual element is not lifelike, an audio hook-up could support a conversation (Mirabito, 1994).

Two-way video conferencing is a costly affair. We need to create the necessary infrastructure to transmit and receive visual signals at both the learning and the teaching centres. Besides, we have to equip the teaching and the learning ends with camera crew and technical staff to manage the two-way video conferencing.

- ii) **One-way video conferencing:** In one-way video conferencing, the audio-video information can be a one-way information or can be a one-way stream from the institution/teaching end to its learning centres or colleges. These centres or colleges may communicate with the teaching end in turn, with a telephone or other audio-based hook-up. The connection can be used for question and answer sessions or the discussion on relevant points and for the clarification of specific details.

The potential of one-way video conferencing (point-to-multi-points) has been demonstrated in India through various experiments conducted by some educational institutions. The system can be used for teaching different topics, including sciences. For example, dissection of frog or conduct of an experiment by the expert can be seen or understood by the students located in different colleges or at homes. The transplant of heart and the specialised surgical procedures can be relayed for medical students to view and learn a valuable medical technique through the real-time meeting.

Computer conferencing

The term computer conferencing refers to computer-based meeting, for exchange of pictures, words, graphics etc., between multiple sites. Special hardware and software systems are used to support computer conferencing activities in both real time and non-real time. Real time, in this context, implies synchronous communication in which messages can be sent and received as you view the screen and interact with the system and the other participants tied in the network. The non-real time elements i.e. asynchronous communication, in contrast, may encompass a series of longer messages, a central database of information and a record of current and past comments and all the participants can see (Mirabito, 1994).

Mobile communication

Satellite-based communication can help learners at two level. One, they can be provided electronic gadgets like radio, cellular phone, etc., which will allow them to remain in touch with the teachers while they are on move from one place to another. It is expected that in future more number of learners would be mobile for their work or business purposes. Secondly, specially designed mobile van fitted with audio equipment, talk back facilities, etc., can be developed. These vans can move from one area to another to impact conduct on the spot education/training. Interested groups can be created around a learning center (preferably in a centrally located village) in the rural and remote area where learners in the adjoining locality can assemble and share their problems with resource persons/teachers located at block or district centres. They can interact with teachers located at different centers using satellite technology.

The number of mobile phone users has increased leap and bound in the recent years. As a result of various technological options the mobile phone users in the country has exceeded 23 million. According to TRAI (Telecommunication Regulatory Authority of India), if the same growth rate is maintained the target of teledensity of seven phones per 100 persons by 2005 is likely to be met by the end of this year (HT, 2003)

The very small aperture terminals (VSATs) is a compact satellite dish mated with the necessary electronic hardware to create an earth station. The earth station consists of a small antenna (generally less than 2.4 meters in diameter) and other devices to interface between the antenna and the end-user equipment. The end-user equipment could be one or more personal computers (PCs), telephone, a PBX, a video receiver/player, or any combination of these (Amritkar, 1995). VSAT can receive or, in another configuration, receive and transmit signals. A VSAT can link a few, or if necessary, hundreds of sites, including geographically remote locations.

A VSAT supports a variety of network configurations, and a large information including computer data, can be transmitted on different speeds. The VSAT is more flexible and less expensive than many land-based communication networks.

The advent of VSAT, now a decade old, has broken the barrier of distance and difficult terrains. A VSAT-based wide network creates a highly reliable, error free and flexible information highway compared to terrestrial alternatives available. In the Indian context, due to non-developed terrestrial links, VSATs are becoming an ideal mode for communication. VSATs can form a healthy backbone and can play a vital role in basic telephony.

VSAT is useful for institutions/universities with multi-campus. Due to its dependency on wireless communication transmission medium, VSAT has overcome many problems of telecommunication. It is a viable technology when terrestrial lines are costly and difficult to install. It has, therefore, become very attractive to existing terrestrial networks in terms of availability, performance, variety of services, cost per byte transmitted and cost per incremental capacity growth. As a result, now there is no need to invest in high capacity transmission lines, which are very difficult to create to cover the entire country. VSAT can provide cost effective, reliable telecommunication over large geographical areas, replacing or supplementing traditional terrestrial lines (Amritkar, 1995). Telephone and services such as e-mail and data transfer via VSAT do not require the use of radio frequencies.

VSAT is being used to transmit voice and data. It, however, can be designed to carry voice and visual also. Video conferencing through VSAT may be feasible in future. However, the system may cost high and there will be a time lag in communication. The problem of time lag can, however, be solved by LEOS (Low Earth Orbit Satellites) which can be placed at a height of only 800 kms.

VSAT can be connected with computers and LAN (Local Area Network) to keep the main institution in touch with learning/training centres. It has a number of advantages over terrestrial line-based telecommunication (Amritkar, 1995). The main advantages are as follows:

- It is more reliable, the call completion rate is very high (99.5 percent).
- The cost of expansion is not dependent on distance.
- The user incurs a fixed cost for VSAT services, irrespective of distance.
- Communication need not pass through ground facilities.
- Transmission of huge data in less time across long distances is feasible.
- Being a modern telecom technology it is suitable for a large country and with areas of difficult terrain.

Jha (1995) identified the following advantages of VSAT system over the terrestrial network:

- The cost is uniform and does not depend on distance, hence useful for hilly, remote and ill-connected areas.
- Response time is much lower than dial up-link.
- Speed of transmission is much higher.
- LAN to LAN connectivity via VSAT is unique for data transfer.
- Point-to-multi-point communication is possible.
- There is no interruption due to frequent changes in weather.

Besides these advantages, according to Chowdhary (1996) the strategic benefits of VSAT are:

- Cost management: Institutions can fix their communication costs and make them.
- Predictable: So each your communication budget can be planned accurately.
- Greater productivity: A single transmission medium and the centralised monitoring and control provide higher quality and better management. There is a single point of contact for operation, maintenance, rapid fault isolation and trouble shooting.

There are certain hindrances in the growth of VSAT technology in the country. Important among them are:

- Lack of interconnectivity with PSTN (Public Switched Telecom Network),
- High costs of satellite dishes, and
- Slow growth in demand for the services.

These and some other issues are affecting the growth of VSAT services in the country.

Self-assessment

4. *What is DTH? How is it helpful for masses?*
5. *How is satellite used in educational activities?*
6. *How is the telephone helpful in teaching-learning activities?*
7. *Differentiate between audio conferencing and video conferencing.*

Internet and Intranet

Internet: The internet is an electronic mail system and library access facility. It is a mail system because it allows us to send and receive messages. It is library access system because it allows our request for information, provided we know what we are looking for. It is a wonderful means allowing access to information, amorphous mass stored in databases. With advent of internet there emerges a belief that there is another structure to support teaching and learning. By sharing information it facilitates an educational process.

Internet is growing at a very fast pace all over the world. India is no exception in this regard. Internet is a set of various intranets created by the various agencies. In other words, it is a network of networks, a huge source of inter-connected information. Internet makes information on any topic under the sun available to its users linked with networked computers. The users can interact with master computer to navigate for required information. Internet is being used for both the delivery of distance

education and assisting regular/conventional classroom courses. Internet also transforms two-way communication, reducing barriers of time and space. The scale of its coverage, its immediacy, the quality of presentation and the ability to interact with it and through it bring new dimensions to the world of knowledge, thus creating new communities of learning.

Internet brought a change in the teaching-learning process. The students control the content and the process of their learning. The new paradigm places learning with the students. The earlier paradigm was that teacher must use technology to teach students. The new paradigm involves students using technology to learn. The students go beyond the experiences of teachers, beyond books in the library. They may find conference papers as yet unpublished, press releases and news items from any part of the world (Jenkins, 1998). The latest information/content in the area of their interest can be downloaded and used as and when required. Thus use of internet places the focus on the students. This in turn focuses on aspects such as student's prior knowledge and experience, readiness and motivation to learn.

There is very little experience of delivering courses via the internet. The logical choice is that the strengths and weaknesses that apply to computer-based learning will apply to most aspects of teaching and learning through the internet. It enables the student to study/learn at a time convenient to him/her. Thus, it provides individualised instruction and is capable of providing almost instant feedback.

Intranet: New communication technologies have created networks for sharing educational resources. The networks allow one-to-one, one-to-multipoint, or multi-or-multipoint communication between students and teachers, and among students. Depending on the coverage of the area i.e. the size of the networks, there can be two types of communication networks: local area network (LAN) and wide area network (WAN)

LAN is confined to a limited physical area, such as various schools in a towns, or various departments or units of a university, and share information and infrastructure. Thus, LAN can create an integrated learning environment where students can plan joint projects, can discuss their problems/queries related to their study. LAN can link the students to wide area network (WAN).

WAN links various institutional centres or campuses located in different parts of the country or outside the country. Various centres or campuses of an institution or various institutions are networked to share information, ideas, data, resources, etc. The interconnection of LAN and WAN can make communication more effective, catering to the local needs as well as global needs of the students. In other words, the students can access various LANs through WAN. Due to technological developments, various networks, (LANs and WANs) have been created all over the world, linking inter connected servers.

LAN and WAN can be interconnected among themselves and with internet, thus making communication global. In this way a communication network can be created which interconnect all the networks in the world, converting it into a 'global village'.

Many communication networks have been created in the country to disseminate and share information. These networks are being used for the various purposes.

Self-assessment

8. Differentiate between internet and intranet.

Summary

In this unit, we discussed emerging communication and information technologies. Our discussion centred around three major areas of emerging technologies. These are audio-video technology, computer technology and telecommunication technology and networks. Under audio-video technology, we discussed interactive broadcasting, teletext and videotext. Under computer technology we discussed computer, videodisc, compact disc-interactive, e-mail and multimedia. Under telecommunication technology, we discussed communication satellite, telephone and fax, teleconferencing and VSATs. Teleconferencing is also of three types: audio conferencing, video conferencing and computer conferencing. Lastly, we focussed on internet and intranet and provided some examples of intranet.

Unit-end activities

List various telecommunication and information technologies available in your town/college and nearby higher education institutions. Access the utility of these technologies for instructional purposes.

Suggested readings

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Answers to self-assessment

1. Virtual reality provides computer generated virtual environment which can be used as the most advanced tool of visualisation for a large number of scientific application like realistic simulation of natural phenomenon, conducting hazardous experiments.
2. The three advantages of videodisc are:
 - a) Videodisc is a flexible medium giving control to study paths, access at any point in the programme, and feedback as required.
 - b) It has also motion and reverse display facilities.
 - c) It has also facility of random access.
- 3) E-mail has three major educational applications:
 - a) **Pedagogy:** Students can have easy access to vast amount of information resources through e-mail.
 - b) **Research:** Researchers can use e-mail to access data, and to exchange with their research guides and experts.
 - c) **Administration:** E-mail is also used in day-to-day administration. Sending and receiving messages at a conventional time, in a rapid, error-free and cost effective manner are possible through e-mail.
4. DTH is Direct to Home television service which works through a table-fan sized satellite disc and a digital decoder and a SIM card. It is useful for masses in scattered population and rural areas where cable or satellite down link facilities are not available.
5. Satellite is used for education and development. In SITE programme, satellite was used to teach primary school children in the rural area. Satellite technology is also used to provide two-way communication. The ISRO conducted various experiments using satellite for two-way interactive communication between teachers and students.
6. Telephone is helpful in teaching-learning activity. Teaching through telephone activates motivation, directs attention, stimulates recall of relevant prerequisites, and provides learning guidance and provides feedback.
7. An audio conferencing is an extended telephonic conversation in which one talks with several or more students located at multiple sites. Students can hear the teacher and ask questions through the same system. In video conferencing, students can see as well as hear the teacher or both the teacher and students can see and hear each other.
8. Internet is an electronic mail system and library access facility. It is a mail system because it allows us to send and receive messages. It is a library access system because it allows us to our request for various information. Intranet is network of communication technologies. Networks can be of two types: local area network (LAN) and wide area network (WAN).

Notes



