
UNIT 1 MEDIA IN DISTANCE EDUCATION: AN OVERVIEW

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1.0 INTRODUCTION

A discussion of why and how the various media are used in the teaching-learning process is the point of focus of this unit. In the first phase, this discussion includes the classification of media, as well as their merits and limitations in the context of teaching-learning transactions. As the next step, the unit then proceeds to explore the ways to select and integrate appropriate media components into the instructional design. The primary aims of this unit are to:

- explore the ability of educational media in the instructional design specific to the context of distance education; and
- provide an overview of media in distance education.

1.1 OBJECTIVES

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

- explain the need to use the media component in the educational process in general;
- compare Romiszowski's and Bretz's taxonomies of educational media;
- list the attributes of various educational media;
- compare the print and non-print media in terms of their merits and limitations;
- explain the concept of media facilitation;

- list the appropriate media for realising cognitive, affective or psychomotor instructional objectives;
- describe the process of media selection;
- outline the ACTIONS framework for media selection;
- justify the need for media facilitation, media selection and media integration; and
- apply the concepts and processes discussed in this unit to various local situations.

1.2 ROLE OF MEDIA IN THE DISTANCE EDUCATION

It has been said that the various kinds of media are extensions of man. All modes of communication would be examples of media (for example, letters, television, films, communication, roads and railways). Educational media are, therefore extensions of the teachers, and facilitate the communication between the teacher and the students. The media (in the DE context) constitute an integral part of the process of planned instruction. We know that distance education has four essential characteristics: (i) the learners and the teachers are at a distance from each other; (ii) most of the educational content is conveyed to learners through one or more media e.g. print, television, radio etc.; (iii) a professional agency is responsible for the programmes; and (iv) the instructional system provides for two-way communication between the learner and the teacher, the tutor or the administrator. Thus educational media are carriers of educational information and instructional material over a distance between the tutor of DE institution and the learners.

1.2.1 Classification of media

Various media experts have proposed taxonomies of educational media. Romiszowski (1974) developed his taxonomy on the basis of sensory channels used in carrying information. His media classification is shown in Table 1.

Table 1: Romiszowski's classification of educational media

Sensory Channels	Major Illustrative Media
Audio	Teacher's voice, language laboratory, audio tapes, radio broadcasts etc;
Visual	Pictures, charts, models, handouts, film slides, transparencies, programmed instructional material etc.;
Audio-Visual	Open channel television, closed circuit television, videotape, etc.;
Tactile	Working models, simulated devices, adaptive teaching machines etc.

Romiszowski's classification is based on a single criterion i.e the sensory channels used in receiving information. It is, therefore, considered quite

inadequate. Schramm (1977) proposed a two-tier classification of educational media i.e. big media and small media. According to Schramm, big media are "the glamour boys of the field" and they are more expensive and based on new technologies. Small media, on the other hand, are relatively much cheaper and based on early and intermediate technologies. Television, sound film, computer and interactive video are some examples of big media; transparencies, slides, various types of boards represent small media.

However, Bretz (1971) has developed the most comprehensive taxonomy of educational media and it has found acceptance among most media experts. Bretz's media taxonomy is based on two criteria i.e. the type of information they communicate and whether they are primarily recording media or telecommunication media. Bretz divides information as *audio* or *visual* and *still* or *motion*. He further sub-classifies the visual sector as comprising picture, line graphic and print. Picture and print are the two extremes of the visual continuum; line graphics occupy the middle position. Bretz initially subdivided the audio sector into four categories viz.; the human voice, natural or artificial sounds, noise and music. However, he treated the audio sector as one whole and did not subdivide it. In other words Bretz divided educational media into seven classes.

They are listed below:

Class I	:	Audio-motion-visual media
Class II	:	Audio-still-visual media
Class III	:	Audio-semi motion media
Class IV	:	Motion-visual media
Class V	:	Still-visual media
Class VI	:	Audio-medium
Class VII		Print medium

Bretz's print media are different from what are commonly known as print media. The printed book belongs to class V i.e. still-visual media. Various classes of media have different capabilities to carry different types of information. For example, Class I media is the most versatile and powerful because they can record and transit all types of information. Class VII media have the most restricted capability.

Bretz's classification is based on quantitative as well as qualitative principles of valuation. However, the greater versatility of Class V media compared to that of class VI media is superficial because of the sub-classification of the visual sector. Had Bretz subclassified the audio sector, then the differences between these two classes would have more or less disappeared. Lastly, Bretz describes his taxonomy in terms of hardware. The great variety of hardware available and being developed from time to time makes its complete listing almost impossible. Bretz himself admitted this shortcoming subsequently.

So far, we have studied the concept of 'educational media' and two taxonomies of educational media: Romiszowski's and Bretz's. It would be worthwhile to mention here that both these taxonomies have their limitations.

Having discussed Romiszowski's and Bretz's taxonomies of educational media, let us try to assimilate them into a simple classification/grouping for better and easy understanding. Many educational technologists prefer to categorise media into basically two groups: interactive, and non-interactive. Within these two broad groups they put all educational media. From another point of view educational materials could be classified into five categories, viz. (i) print (ii) audio, (iii) video, (iv) 3-d models, and (v) integrated. Now let us make a matrix of these five categories and the former two groups to classify the range of educational media available to us. Table 2 depicts the simple classification based on this matrix.

Tables 2: A Simple classification of educational media

Media	Non-interactive media	Interactive media
Print (Text/graphics)	Textbooks, Pictures, charts SIM(interactive partially), Teletext	—
Audio	Audio tape, Radio, Audio vision (partially interactive)	Radio-phone in Audio conferencing, Audiographics Telephone
Video	Videotape, Television, Cable T.V.	Interactive TV, Video teleconferencing (one way/two- way audio)
3-D models	Physical objects, models, Home kits	Computer generated 3D models
Integrated	Radiotext, Word Processing and Presentational software, WWW(partially non-interactive)	Computer based media Interactive Multimedia Internet, WWW, Videotext

Check Your Progress 1

Notes: a) Space is given for your answers.

b) Compare your answers with those given at the end of this unit.

- i) Define 'educational media' in general and also in the context of distance education.
- ii) Briefly describe Romiszowski's scheme of media classification. Give two examples for each class.

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1.2.2 The Print medium

It is common knowledge that 'print' has been in use as a pedagogic medium for quite a few centuries; it was used even before the first printing press was set up at Guttenberg. It has been the major if not the sole medium of formal face-to-face education. Recent studies have revealed that even in distance education, print continues to be used as the most dominant medium. Dichanz (1982) in his "Reflections on the Use of Media in Distance Education" states that in West Germany, 90% of all study materials at the Fern-Universitat are printed materials and that there is little variety in the use of media. The U.K. Open University enjoys a good reputation for its innovative use of various educational media and Hawkridge has this to say about the Open University: "Print is the principal medium through which Open University students learn. They spend about 90% per cent of their time reading and writing, except in some science and technology courses for which the proportion may be some what lower on account of practical experimental work". In India too, the picture is more or less similar. All distance education institutions in India use print as their major educational medium.

Limitations of print medium

Like any other pedagogic medium, print too has its merits as well as limitations. Predominant use of print as an educational medium on a large scale can be attributed to two factors: i) its merits, and ii) its low cost vis-a-vis other media. Print is often described as "frozen language", absolutely cold, dead, unrelated to reality and totally cut off from the context of experience and therefore irrelevant. No sane and enthusiastic teacher, it is argued, would choose to use print as his/her first preference, since 'print' implies 'printed languages', all the shortcomings of language are also attributed to 'print'. These are chiefly four:

- i) Language is a poor substitute for direct experience.
- ii) Language can be misleading and therefore it cannot be trusted.
- iii) We participate and live in an oral culture, so education through print is dispensable as well as undesirable.
- iv) Problem-solving calls for direct action, hence print cannot be a substitute of direct action.

Besides these ideological criticisms, there are some practical limitations as well.

- i) Print is a demanding educational medium because its effective use depends upon a reasonably adequate level of literacy among learners.

- ii) Print is effective only when the reader possesses well-developed cognitive skills for comprehending the text and evaluating its thought content.
- iii) Reading is a linear sequential process in which words as well as lines have to be processed in a certain sequence i.e. left-to-right, right-to-left or top-to-bottom. A visual image on the other hand can be processed as a whole and understood almost spontaneously. One just looks at it and understands its content depending upon his/her power of observation.
- iv) Reading printed material is much more time-consuming than viewing the same content through images e.g. a TV programme.
- v) Reading is unsuited for developing skills, irrespective of whether these skills are interactive or managerial or psychomotor. Reading a printed lesson can provide theoretical information about how to drive a car but it cannot provide a person with the skills required for driving a car.
- vi) The language of the printed lesson is chosen according to the writer's assumption about average readers. Once written, the language of a printed lesson is fixed; it does not change for below-average or weak learners. Hence it is argued that print is not an appropriate pedagogic medium to do justice to learners of different abilities; usually weak learners and learners with reading disabilities are the worst sufferers.

Merits of print medium

These criticisms establish that even the most widely used pedagogic medium needs to be defended; however, defending it is not a difficult job. Print has certain merits that account for its widespread and universal use in all modes of education including the distance mode. Briefly put, 'print' has the following merits as an educational medium.

- i) Print provides relatively permanent instructional material that can be processed whenever one wants to; it is singularly free from strict time-schedules that go with television and radio. What is perhaps more important is that one can process printed material anywhere, while travelling by road or air, before going to bed or after getting up early in the morning. Other media impose many more restrictions on learners; print is the least restrictive medium.
- ii) It is true that images on TV can be processed almost instantaneously but it is very doubtful if learning from viewing television is equally instantaneous. In fact, time is the most important variable in all learning. The rapidly changing visual images are literally bombarded on the learner and the entire process is a "hit-or-miss" process. Processing printed material takes more time and greater time devoted to the task ensures more and better learning.
- iii) Print allows the learners to learn at their own pace and in a style best suited to them because it gives them more options for selecting a better learning strategy or even initially trying out many strategies and choosing the most effective one. Thus print individualises learning in a unique manner.

- iv) Use of print as an educational medium is in perfect consonance with our highly developed cultural ecology. In fact, all developed cultures are heavily print dependent. Education through imitation, demonstration and the oral word characterises a primitive rather than an advanced culture.
- v) Certain kinds of thinking involved in the process of education make the use of print medium almost inevitable. Defining, qualifying logical constraints, elaborating or sequencing complex reasoning necessities the use of print. Elaborate scientific thought and development of novel essay and belles-lettres as literary genres are unthinkable except in print medium.
- vi) Learners who have learnt to read prefer the use of print medium. It is common knowledge that students who find their teacher's lectures boring claim to learn better through reading assignments.
- vii) Abstract thinking involves the use of symbol systems and therefore print is uniquely suited to abstract thinking. As we move away from concrete reference of learning, use of language becomes indispensable and print assumes special importance.
- viii) Print remains the cheapest educational medium to use even today. It scores over almost all other media in terms of cost, portability and singular freedom from dependence on any hardware for its users.

Thus we can conclude that like all other educational media print has its strengths as well as weaknesses. Print is exceptionally useful for:

- developing understanding of complex concepts and processes;
- developing basic learning skills of reading and writing that help a learner become more and more autonomous; and
- helping learners to take stock of their learning through interpolated questions (as is being done through self-check questions in these lessons); this enables the learners to review their learning and structure it properly by establishing linkages with preceding portions or lessons.

In fact we would do well to remember that even the big media such as computer and television technologies use print even if very briefly. Notwithstanding the merits of print medium, our focus in this unit is on non-print media as such.

Check Your Progress 2

Notes: a) Space is given below for your answers.

b) Compare your answers with those given at the end of this unit.

- i) Describe any three major shortcomings of "print medium".
- ii) List any four features of the print medium that account for its wide spread use in education.

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1.2.3 The Non-print media

The non-print media are loosely called the “electronic media” as well, but certain non-print media are not at all electronic e.g. 3-D models and home-experiment kits. However, most of these are electronic based and they can, therefore, demolish distance in a unique manner. Let us first examine some of the merits that non-print media have in the context of distance education.

- i) **Greater delivery capabilities:** The non-print media, especially those in the electronic category, can simultaneously reach learners at different places and also give them a feeling of belonging, of being members of a large organisation and thereby take care of their feeling of isolation, and the feeling that just because teachers do not teach them in face-to-face situations, they do not matter to the system. Table 3 shows the delivery capabilities of different non-print media.

Table 3: Delivery capabilities of non-print media

Individual learners	Medium size groups at one place	Scattered individual or groups
Telephone	Films	CCTV
Computer-assisted instruction (on sharing basis)	Videotapes	open broadcast television
	Film strips	Radio
	Slides	Fascimile
	Audiotapes	Slow-scan television
	Charts, posters	
	3-D models	
	Slow-scan television	

- iii) **A supplement to the master medium:** We know that most DE institutions use print as their principal or master medium. The non-print media can provide excellent support to the print media because of their versatile capabilities. There are certain qualities that make educational media function as a good supplement. Portability, complete control over when to use it as well as over its functions, and possibility of its use by the individual against that by the group are a case in point. These features of the non-print media as means to supplement the master medium are clearly shown in Table 5 below.

Table 4: Non-print media as a supplement: Criteria-based analysis

MEDIA	CRITERIA			
	Portability	Individualized use	Control over use	Control over functions
Television	Yes (portable models only)	Yes	No. TV Schedule pre-determined	No
Radio	Yes	Yes	No	No
Film	Yes (for portable models only)	Yes (though costly)	Yes	Yes
Photographs	Yes	Yes	Yes	Yes
Slides	Yes	Yes	Yes	Yes
Audio Tape	Yes	Yes	Yes	Yes
Video Tape	Yes	Yes	Yes	Yes
Computer	Yes (only for Notebooks)	Yes	Yes	Yes
Videodisc	Yes	Yes	Yes	Yes

- iii) Greater suitability to iconic and enactive modes of experience:** Bruner has proposed a three-tier classification of experience: *Enactive* (involving activity), *Iconic* (using pictures, graphic or 3-D representations) and *symbolic* (based on the use of symbols). Print is suitable for symbolic experience. The non-print media can make educational experience more comprehensive. For example pure verbal description in print cannot teach a person how to tie even a simple knot, but slides, silent or sound films or videotape can convey this information most effectively. Similarly, work on home experiment kits can enable a student to master the use of various techniques through the enactive mode. Print is an ineffective medium for providing such learning experiences.
- iv) Feedback through recorded performance:** Some non-print recording media can record the learner's performance and provide extremely useful feedback. For example, audio-tapes provide excellent feedback about one's mastery of the sound system of a language or video tapes provide much-needed corrective feedback for other types of performance. Print medium is of little use in this respect.
- iv) Facilitate diverse learning objectives:** In distance teaching the instruction moves away from the conventional face-to face teaching mode and a reasonable reliance on various other media becomes necessary to meet diverse learning objectives. Printed matter cannot meet all learning objectives very efficiently. William H. Allen's (1967) chart of presumed effectiveness of different instructional modes for different learning objectives support this statement. The chart is presented below (quoted in Schramm, 1977):

Table 5: Instructional media in relation to learning objectives

Instructional media	Learning Factual Information	Learning Visual Identifications	Learning Principles, Concepts and Rules	Learning Procedures	Performing Skilled Perceptual Motor Acts	Developing Desirable Opinions & Motivations
Still Pictures	Medium	High	Medium	Medium	Low	Low
Motion Pictures	Medium	High	High	High	Medium	Medium
Television	Medium	Medium	High	Medium	Low	Medium
3-D Objects	Low	High	Low	Low	Low	Low
Audio-Recordings	Medium	Low	Low	Medium	Low	Medium
Programmed Instruction	Medium	Medium	Medium	High	Low	Medium
Demonstration	Low	Medium	Low	High	Medium	Medium
Printed Textbooks	Medium	Low	Medium	Medium	Low	Medium
Oral Presentation	Medium	Low	Medium	Medium	Low	Medium

- vi) **Contribute to specific learning activities:** Certain non-print media formats and delivery systems contribute particularly well to the distance student's learning activities. For example, audio-tapes or computers can be used effectively to drill and provide practice to learners in arithmetic and language learning. Electronic media can help promote the 'discovery' approach to learning. For example, a film can be exploited, for discovery teaching in the physical sciences. Students keep watching the various sections of the film until they perceive the relationships between the visuals. Then they are curious to find out the principles that explain those relationships. Likewise, in the social sciences various media types can be used to present learners with visual and auditory experiences that provide related information and questions. Films and simulations are often used to present 'real-life' or 'laboratory learning' situations requiring inquiry into problems and discovery of their situations.
- vii) **Motivate learners psychologically:** The use of electronic media has proved psychologically exciting for students — both at the preparation and the participation stages — and consequently it promotes learning. Several of the introductory functions, such as directing attention, arousing motivation, providing a rationale, etc., may be served by non-print media more effectively than by a printed text. Variety and newness of these media interest and motivate students to learn.

These media have the power to stimulate interest and appeal to the neo-literate while the print material turns out to be a stumbling block for such learners. For example, the experience of Korea in providing non-formal education with the use of television shows that "the excitement of television sometimes leads participants in a project to undertake tasks they might otherwise hesitate to attempt" (Schramm, 1977: 171).

- viii) **Help learners get involved:** Many studies have emphasised how the non-print media achieve learner involvement and participation and thereby facilitate learning. Continuous active participation is lacking in learning at a distance through conventional texts where students' response to the instructional stimuli and the reinforcement of correct response are delayed. Some electronic media lend themselves more to student participation than the print material. Heinich et al. (1982-83) quote the study of May and Lumsdaire (1958) who found that psychomotor skills are learned better if practised while watching a film in which those skills are being performed. Similarly, overt written or oral small responses during a film have been found to facilitate learning. Even covert responses like silent repetition of key vocabulary and specified points in a lesson are found to be effective. A group discussion after the use of video cassette or films can also be used to enhance learning.
- ix) **Promote participatory learning:** Moreover, electronic media directed instruction increases learners' concentration on a task because teachers employing television for instruction have found that televised instruction receives more concentration and has fewer diversions than classroom instruction. Because instruction through media is structured, the objectives are clearly defined, and the instructional environment is created to achieve those objectives. Print material is also structured with clearly stated objectives but fails to create the desired atmosphere. Non-print media help *provide a learning atmosphere in which students actively participate in the learning process.*
- x) **Accommodate individual needs:** Non-print media have the flexibility of accommodating individual needs and interests, especially through computers. The emergence of technological advances has coincided very well with the increasing awareness of individualised instruction. The variety and flexibility of new media offer the opportunity to adapt any media combination for use in individualised instruction. For example, programmed instructions or the system of audio tutorial instructions are specifically designed for individualised learning. Audio tutorial relies on audio recording to individually guide students' learning activities.

Through individualised instruction, it is possible to treat groups of students to suit the common characteristics they exhibit. For example, handicapped students, who have particular needs, get special instructional treatment. In this way we can best adjust instruction to the characteristics of any given group of students. Adjusting instruction to these special groups requires a heavy reliance on technically developed media and materials and the appropriate selection of those materials to meet the specific needs.

- xi) **Help learners monitor the information input:** Some technological devices like audio cassettes and video cassettes allow the learners the freedom to choose how much information they would like to be

exposed to. They also allow them the freedom to listen to and/or view the whole/part of an information pack as many times as they would like to. Besides, these technologies also enable them to choose their own convenient time to receive any given information.

- xii) **Extend the role of a teacher:** With the use of non-print media, the role of a teacher extends further than merely being a dispenser of information. Media utilisation permits teachers to become creative managers of the learning experience. They can find more time to spend on diagnosing students' problems, holding consultations individually, and offering counsel and guidance.

Check Your Progress 3

Notes: a) Space is provided below for your answers.

b) Compare your answers with those given at the end of this unit.

- i) Briefly describe how non-print media can supplement the print-medium.
ii) Describe three pedagogic uses of non-print media, which are unique to them.

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1.2.4 Application and use of media

Having discussed the strengths and weaknesses of the non-print and print media respectively, we address ourselves in this section to the question of how to put the non-print media to use in helping you achieve the goals of distance education.

Combined use of media

Practically, every distance education expert calls for the integration of media. Educational planners decide that media — print and non-print — should be built into the curriculum in an inseparable fashion because different media serve different educational functions. The distance learner, to a great extent, is deprived of face-to-face interaction. Combined with the print medium the non-print media can play an integrative role to compensate for the absence of the normal teacher-learner relationship in distance education and provide for the varying needs of the learners. The additional media may bring certain levels of understanding that would not otherwise be possible.

In practice, distance education depends mostly on a 'master-medium', occasionally combined with other media. Although found desirable, there is

no set pattern to guide the combinations of media in distance education. Different distance teaching institution combine various media according to their needs, target groups, philosophies, resources and course contents. Various applications of media-mix or various approaches to combine media can be described as follows:

- i) Integrated,
- ii) Complementary,
- iii) Supplementary, and
- iv) Independent.

We shall discuss each of these approaches briefly here.

Integrated media use

An integrated approach is decided at curricular level. It means that 'non-print' media are totally integrated with the 'master medium'— in most cases the master medium is the print. If we present this integration of media in mathematical terms, we can say that hundred per cent of the information is divided between the two media types. It could be 80% print and 20% non-print or 70% print and 30% non-print and so on. Both media types should be integral parts of course development and delivery. Timely instructions are given in the text of either type for the use of the other. For example, we give below extracts from an integrated printed and audio text giving instructions to learners to switch over to the other media (Rowntree: 1986).

The integration of media is such that in this approach the students recognise that 'non-print' media also have something 'special' to teach them and they are taken seriously. As watching TV is a part of a lesson students are motivated to watch it. There are assignments and examinations based on these 'non-print' media parts. This media-mix is integrated into the time assigned to the students for a course.

Text — "Now let's hear the heart's rhythm after the drug has been absorbed. Switch on your tape again and listen to Section G....."

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Tape — "....."

Text — "Activity 10 — what has happened to the heart's rhythm? Write down the two most obvious changes".

Complementary media use

In the complementary approach, the decision is taken at the syllabus-framing level. It is decided that the whole information is to be transmitted through print and non-print media and the division is sharply defined. For

** Author's voice saying: "This is section G, the heart's rhythm after the drug has been absorbed."followed by a 15 second sample of the beating of the heart. Then the author's voice saying: "Now switch off your tape and turn to activity 10 in your course book".

example, if 70% is for print then 30% is for non-print media. This division is clearly indicated in the very beginning, i.e., out of ten units/topics 7 will be covered through delivered texts and 3 through additional media. This approach is particularly suitable for science subjects or subjects like engineering, which have both theoretical and practical components.

Supplementary media use

The prime aim of this approach is to enrich the experiences of learners. The 'master-medium' (mostly, the print) contains all the information and some part(s) of that information is again provided through a non-print medium. For example, a case study might be presented on the TV for a better understanding of a theoretical principle discussed in a management course; or a film on sanitation or nutrition can be shown after a discussion about it in a rural development course.

No planning at the syllabus level is required for this type of media-mix because non-print media can be developed and delivered at a later stage.

Independent media use

By the independent approach we mean that form of distance teaching which does not use print medium to a large extent. Here the essential information is through non-print media (except few media notes). This approach is very appropriate if the target group is not well educated, or has not developed reading skills or the course itself consists of total practical training.

Check You Progress 4

Notes: a) Space is given below for your answers.

b) Compare your answers with those given at the end of this unit.

Briefly describe complementary and supplementary patterns or media mix.

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1.3 MEDIA FACILITATION

Every educational media differs in terms of their attributes, and the effectiveness of each medium also differs for specific learning tasks and specific learner groups. Thus various media make certain types of learning or tasks easier than others. In other words, various media 'facilitate' different learning tasks and different types of learning. 'Media facilitation'

is the process of determining the ideal combination of media attributes to effect optimum learning in a given situation. This process of 'media facilitation' is concerned with answers to two major questions:

- i) Which media attributes are best suited to deliver and provide for given learning tasks and associated learning outcomes i.e. behavioural changes in learners?
- ii) If more than one media is to be used, how to ensure that the chosen media are integrated with each other and with chosen learning outcomes?

Answers to the first question concern "media selection" and those related to the second question concern 'media integration'. Let us now study both these processes in detail.

1.3.1 Media selection

The process of media selection is often considered an extremely important part of course design and course development. Because the process of course design is scientific i.e. systematic and based upon best decisions about various aspect of instruction, the process of media selection too has to be scientific. The decisions regarding media selection are essentially based on media attributes. The phrase "media attributes" refers to the various capabilities of a medium to exhibit characteristics like pictorial representation, size (enlarged, reduced or real), colour (black and white, limited colours, full colour), movement (still, semi-motion, full motion), language (print or oral sounds), and sound-picture relationship (silent or with sound).

We must remember that the process of course design begins with the selection of course objectives. This is followed by the selection of course content. Relevant course content, when presented to and reacted to by learner, it should result in the realisation of course objectives. Thus course content consists of a set of stimuli that must be received and responded to by the learners. The process of receiving these stimuli and responding to them constitutes learning activities. These activities may be practical and overt or internalised and covert. Educational media if properly selected, can enable the learners to receive the stimuli and also to respond to them. Thus an educational medium should be selected only (i) if it is capable of presenting all the intended information to the learners and (ii) if it can enable the learner to take part in the intended learning activities. In other words, the selected medium or media should match the course content and lead to the objectives for which the course content has been designed. This process of media use has been illustrated in figure 1.

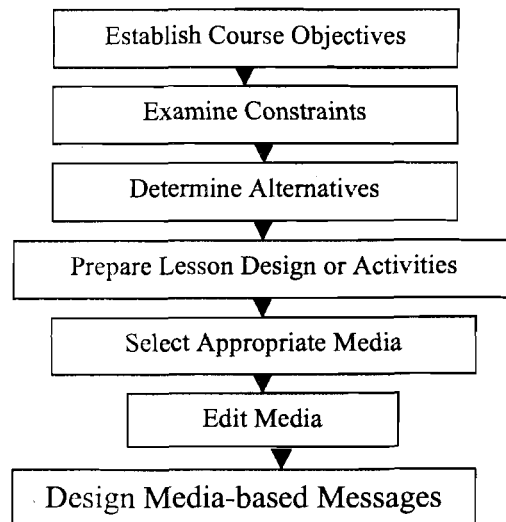
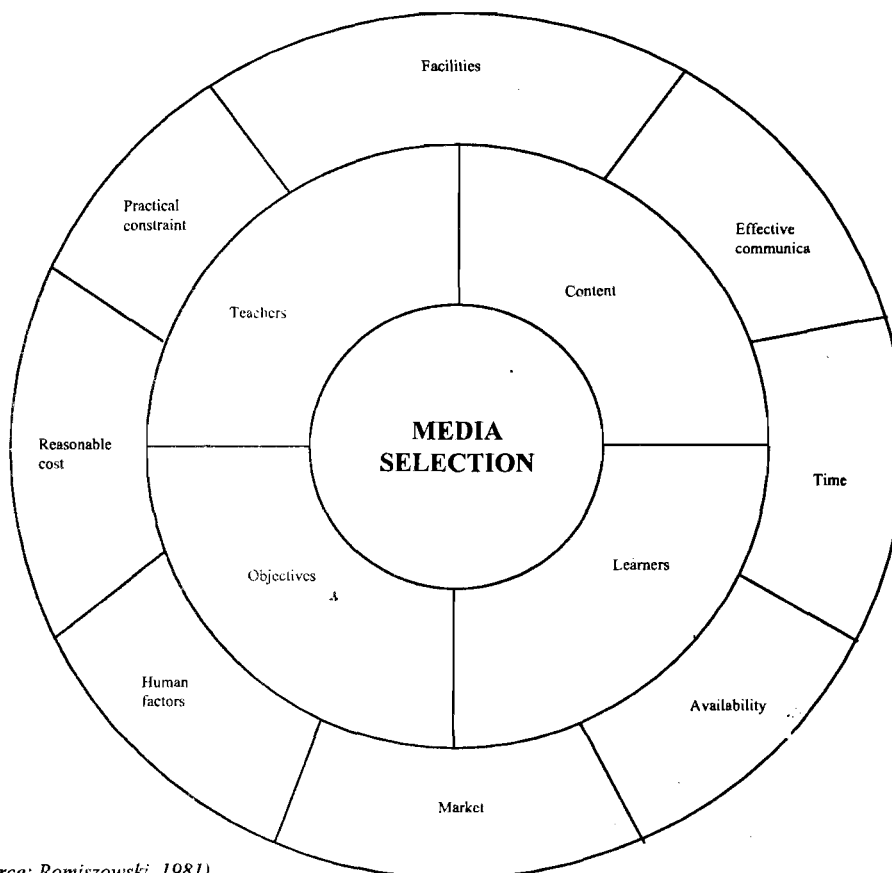


Fig. 1: A sequential presentation of the process of media use

We can infer from Fig. 1 that the process of media-selection should begin by determining course objectives and ideally include some considerations of media-editing too. However, matching media with course objectives is only Phase I of media selection. It is also called “selection by rejection”.

Invariably it results in a short list of selected educational media. Phase II of media-selection involves choosing the media on the basis of other criteria chiefly concerned with the budget outlay and practical constraints of preferences and skills of learners, and some times of teachers too. Various aspects of the second phase of media selection have been shown in Figure 2.



(Source: Romiszowski, 1981)

Fig. 2: Factors affecting the process of media selection

It is necessary to agree on the unit of costing if the process of costing is to be useful. Usually costing unit is determined in terms of "unit of output". Various views about the unit of output inform us that it can be associated with (a) producing support material for one hour of student time; (b) producing one unit of support material e.g. one A4 size sheet for printed lesson or one 35 mm slide etc; or (c) achieving a specific level of learning for a number of students i.e. the length of time needed for acquiring a specified amount of knowledge. These three views about costing unit relate to medium unit cost, item unit cost or student learning unit.

The costs related to a medium may be 'direct' or 'indirect'. Direct costs relate to a specific service or product. Indirect costs, on the other hands are those that cannot be attributed to a specific service or product but are incurred in the overall operation. Costs usually pertain to the expenses on raw materials, labour and overheads i.e. cost on capital goods and equipment.

Now a few words about 'media editing'. Educational media have to be edited in order to improve their effectiveness. This editing can be done at three levels – visual editing, narrative editing and involvement editing. Visual editing and narrative or sound editing needs no explanation. Involvement editing aims at including learner activities within the message of a medium. You will learn more about involvement editing under "media-integration".

Salomon (1974) also recommended a rule for media selection: "The better a symbol conveys the critical features of an idea or event, the more appropriate it is". Thus according to Salomon, the process of media selection for educational purposes should begin with the analysis of the instruction content and the coding system best suited to it (e.g. inactive, iconic or symbolic). The educational medium that can best present the key features of the information to be conveyed to learners must be our choice. Salomon cites an example to illustrate the rule recommended by him. "If the simultaneous operation of valves in an engine is taken as the critical feature, then language would not be an appropriate medium to convey that sort of information". Salomon (1974) nevertheless suggests a rider as well. He cautions that this fitting of the symbolic features of the medium to the key features of content or message can produce the desired cognitive effects only if "the code is isomorphic in some way to the learner's symbolic mode of thinking".

To conclude, the process of media selection is an extremely complex one and no adequate theory exists to support it. Schramm (1977) suggests that instead of asking broad and vague questions like; "Can media teach"? or "What is the best medium"? We would do well to ask smaller, sharper and more specific questions like: "How can we best use a given medium for a given act of instruction? Or in a given situation which medium is more cost-effective than another? Or, how do the symbolic coding systems of a given media relate to what a student learn from it?" Answers to these questions can make the process of media selection appropriate as well as effective.

Like formal face-to-face education, distance education too is based on educational objectives. These objectives may be from the cognitive domain, affective domain and psychomotor domain. Let us now examine various media, which can be used for furthering learners' development in each of these domains.

Cognitive domain

Print — worksheets, text books, short readings, handouts, copies of articles.

Slide — narrated live or combined with audio tape for self-instruction.

Transparencies — used by the teacher to promote problem solving, explain complex ideas that necessitate non-verbal illustrations.

Individualised instruction — through computer, workbook, audio tape or film strip

Live instruction — through contact programmes and guidance at study centre.

TV and CCTV — for presentation of new information, supplementing information presented through printed lesson.

Video tape — for selective viewing of relevant information sought by learners or recommended by course writer(s).

Radio broadcast — for additional information easy-to-comprehend yet scholarly presentation.

Affective domain

Live instruction — quite effective and necessary because human interaction is a powerful means of causing attitudes to be changed; tutor's guidance in making group discussion systematic and participatory for members.

TV/Film/Video tape/Interactive Video — present contrived events but are useful in helping learners experience real emotions; most effective media for presenting events all over the world.

Radio/audio tape — present sound-based realism of human situations for information and empathic sensitization.

Telephone teaching — for providing help or guidance in solving personal or study related problems.

Print — books, magazines, hand outs with material that aims at bringing about affective change among learners.

Psychomotor domain

Audiotape — for step-by-step instructions for completing a task; students just listen and perform accordingly.

Film/TV/Videotape — for demonstration of processes that can be seen and performed by learners; images in motion make model/demonstrated actions appear very natural; slow motion presentation facilitates precise and detailed analysis and examination.

Live demonstration — for real-life study of model performance/procedure and its imitation.

Language laboratory — for learning sound system of target language; for developing auditory discrimination and listening comprehension.

Audiotape — for presenting model utterance(s) and their imitation, for practising stress-placement and intonation patterns, for recording one's speech performance and its subsequent evaluation.

Home experimental kits — especially meant for facilitating performance of experiments at home as part of vocational, technical or science courses; can be integrated with course material for enhanced effectiveness. Table 6 illustrates the merits and demerits of various educational media.

Table 6: Characteristics of various educational media

Medium	Merits	Demerits
Print	i) Cheap ii) Easy to prepare iii) Application in a variety of situations iv) No hardware needed for use	i) Study skills required (from the students) ii) Time consuming
Television	i) Quite easy access ii) Mass coverage iii) Combines sound & visual presentation iv) Wide coverage of content and contexts e.g. lecture, narration, demonstration etc. v) Can shift its focus from extensive to intensive. vi) High-tech appeal. vii) Change in image-size possible. viii) Information density high.	1) Script-writing and production costly as well as complex. 2) Needs costly hardware at user end as well as transmission end. 3) One-way flood of information 4) Prior collaboration between concerned agencies essential 5) Fixed schedule. 6) Limited air-time.
Video tape and Film.	i) Wide application range. ii) Can be stopped and replayed iii) Allows focus shift — extensive to intensive iv) High-tech appeal v) Combines audio and visual presentation vi) Re-usable vii) Permanent record and storage possible. viii) Can be used whenever needed. ix) Slow or fast presentation possible. x) Change in image size possible. xi) Information density high xii) Lip sync in learning spoken language	1) Require costly recording presentation equipment. 2) Technical and professional expertise required for production. 3) Depends on power supply. 4) One-way flow of information.

Overhead Transparencies	i)	Helpful in systematic presentation of information; esp in developmental sequences.	1)	Need OHP and electricity
	ii)	Easy to use	2)	Need complex skills for advanced level preparation.
	iii)	Presentation rate can be varied	3)	Not easily portable
	iv)	Easy to prepare		
	v)	Quite cheap		
	vi)	Useful for large groups.		
Audiotape	i)	Easy to prepare	1)	Tends to be over-used
	ii)	Re-usable	2)	Fidelity decreases with use.
	iii)	Applications in a variety of situations	3)	Recording often faulty
	iv)	Equipment & tapes easily portable	4)	Fixed rate of presentation of information.
	v)	Duplication easy and cheap		
	vi)	Especially suitable for language teaching		
Radio	i)	Easy access	1)	Fixed time schedule
	ii)	Portable hardware	2)	Depends on power-supply.
	iii)	Relatively affordable because cheap	3)	One-way flow of information
	iv)	Mass coverage	4)	Script-writing and production quite technical & need advanced skills.
			5)	Costly capital hardware needed
	v)	Can be edited for easy comprehension.	6)	Involves prior agreement for education use between educational institution and radio agency.
Computer	i)	Present verbal, digital as well as graphic information.	1)	Computer literacy including programming skills essential
	ii)	Can interact with learners by asking or answering questions.	2)	Requires more capital input
	iii)	Maintains a record of answers.	3)	Variety of software essential.
	iv)	Can control other media hardware as well.	4)	Suitable only for individual learners or small-size groups.
	v)	Individualises instruction in terms of learners need(s) and pace.	5)	Use of hardware and software across various systems is often difficult.
	vi)	Can interface computer and video		
	vii)	Can simulate experiences and situations.		

It can be rightly concluded that the variety of media at the service of education through face-to-face and distance mode is truly impressive. One would however, do well to remember that the media are merely the means to deliver content. Even the most sophisticated media are useless unless the instructional content they are to carry have been carefully and systematically designed. Thus there is a need for media experts and academics to work together.

Even though the pedagogic merits of various educational media have been described above in brief, broadcasting deserves a little more detailed description. The experience at the U.K. Open University provides a very useful example for us.

Even before the Open University was established, the Planning Committee responsible for it concluded a provisional agreement with the British Broadcasting Corporation for providing production and broadcast facilities for television as well as radio. This agreement made BBC-2 and Radio-3 channels available to the open university. The first seven years of this partnership resulted in the production of more than 4,000 programmes of 20 minutes duration each both for TV as well as radio. The total weekly programme time for the Open University TV broadcast is in the vicinity of an impressive 36 hours now; the figure is about 30 hours for radio. Studies have revealed that Open University students use not more than 5% of their time for each of the broadcast media. These students have an easy and regular access to both media and on the average, they view two-thirds of the TV broadcasts and about 50% of the radio programmes. Thus TV is a more popular medium than radio with DE students in the U.K. On the whole, use of the broadcast medium, especially of TV, ranks next to print in the Open University system. TV has an edge over other educational media in terms of the variety of its uses. The tele-teacher or the presenter does not appear on the small screen all the time. In fact, after making his appearance his voice represents him fully and the screen can be put to a variety of uses while the voice-over provides invaluable description, explanation or focus. The video camera lens may present a set of material aids or other visual aids in a predetermined sequence and occasionally it may take close shots to help the learners focus attention on minute details.

The Open University now faces two problems in its use of the broadcast media. The first relates to high production costs and the second to the limits on air-time availability. This has led to a search for alternative delivery systems.

Doordarshan, India's equivalent of the BBC, is in the fourth decade of its existence. On 15th September 1959 in a make-shift studio-cum control room, it made its historic debut though not free from fault debut and was then called 'the new toy' by Pt. Jawahar Lal Nehru, the then Prime Minister of India. Now it claims to be one of the world's largest networks. Scores of its production centre and around 350 transmitters provide entertainment information. It is now gearing its effort to set up additional production centres and transmitters for coverage of 80-90 of its population by the turn of the century. As an educational medium, Doordarshan has an impressive track record: SITE (Satellite Instructional TV Experiment) in six states, changeover from SITE to INSAT and now the three-tier educational telecast for primary, secondary and higher education sector. The UGC programmes are the latest addition to educational TV in India. Also there is the regular broadcast of IGNOU programmes on Doordarshan.

Thus the TV as a versatile delivery medium, has already made its entry in the arena of distance education in India but the problems of production costs

and air-time availability, especially in terms of suitable time-slots still remain.

As more flexible delivery alternative, the problems of access and regularity with regard to educational television remain to be tackled. Since providing video cassettes and a TV receiver to individual learners is impossible, the only viable alternative is to stock a sufficient number of various video-taped programmes and a video player and TV monitor at study centres.

Distance learners could make use of this delivery medium to suit their time and needs but questions of easy and regular access shall continue to engage our attention for some years.

Check Your Progress 5

Notes: a) Space is provided below for your answers.

b) Check your answers with those provided at the end of this unit.

- i) List any four educational media that can be used for realizing cognitive domain objectives. Briefly describe how each of these can be put to use.
- ii) List any four educational media for developing the psychomotor skills of DE students. Briefly describe how any two of these can be effectively used.

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Bates criteria for decision-making

Having discussed the media selection process in detail let us consider another approach to decision-making propounded by A.W. Bates, who call it the "ACTIONS" framework for deciding the use of technology in open learning. Bates suggests that every institution should take decision on the basis of answers to questions regarding ACTIONS:

Access: How accessible is a particular technology for learners? How flexible is it for a particular target group?

Cost: What is the cost structure of each technology? What is the unit cost per learner?

Teaching and learning: What kinds of learning are needed? What instructional approaches will best meet these needs? What is the best technology for supporting this teaching and learning?

Interactivity and user-friendliness: What kind of interaction does this technology enable? How easy is it to use?

Organisational issues: What are the organisational requirements, and the barriers to be removed, before this technology can be used successfully? What changes in organisation need to be made?

Novelty: How new is this technology?

Speed: How quickly can courses be mounted with this technology? How quickly can materials be changed?

Access: A distance learner may learn at home or at work place or at a local centre. How much technology is available to a learner will depend where he/she is placed at the study time. Open access, home based learning will be limited in many countries to relatively few technologies. For example, the poorest countries may be in a position to use only print and radio, while slightly wealthier countries may use print, radio, audio cassettes and possibly television. The developed countries will use all these and the telephone, the computer and so on.

Availability is only the tip of the iceberg though. Even in the wealthiest countries, there is always a section of people who do not own a television or even access to a telephone. Is the use of a technology to be denied to those who have access to it, so as not to discriminate against those who do not?

Cost: A number of general points can be made about the balance of costs for different technologies:

The cost of putting equipment into local centres can far exceed capital costs — for example, for organizations with multiple study centres.

The major cost of using technologies for teaching is in production rather than capital and hence it is recurrent for instance, the yearly recurrent cost often exceeds the total start-capital cost: in general, the recurrent costs of producing good quality technology-based materials tend to be underestimated.

Technologies vary considerably in their fixed and variable costs:

- Audio cassettes and radio have low fixed and low variable costs;
- Face-to-face teaching, computer-mediated communication and tutor-mediate tele-courses have low fixed costs but high variable costs;
- Pre-programmed computer-based learning (CBL) and video discs have both high fixed and high variable costs, if work-stations are to be provided;
- Since production is the main cost, and hence fixed for any course, for most technologies currently used in national distance teaching and open learning institutions fixed costs usually far exceed variable costs; this means that the economies of scale apply to 'traditional' distance education courses: the more students, the more cost effective technologies become;

- Some of the newer interactive technologies, such as computer conferencing and audio-graphics, reduce fixed costs, but have high variable costs; thus, while suitable for sources with relatively low student numbers they will be very expensive for courses with large student numbers;
- Broadcast distribution is likely to be uneconomical for national distribution with less than 500 students per course for television, or less than 1,000 students per course for radio; satellite distribution may be economically viable on a regional or sub-continental basis, if the production costs can be justified in terms of the likely target audience;
- Audio cassettes are a particularly economical medium; audio cassettes plus, for example audio vision is usually a cheaper combination than the cheapest form of video or computer-based learning.

It can be seen that the likely size of a course, in terms of student numbers, is crucial in influencing the choice of technology.

Teaching functions: You might feel that teaching functions should be the first criterion to be considered. After all if the technology is not effective, as a teaching tool there may not be much point in using it. However, it is much easier to discriminate between media on the basis of access or cost than on that of teaching effectiveness. The bases of media are flexible. Each medium can be used in a wide variety of ways. Consequently, difference within a medium (for example, a televised lecture and a documentary) may be greater than between media (for example, a face-to-face lecture and a lecture on a radio programme).

The choice of media depends on their presentational qualities and ability to develop skills. The presentational qualities of each medium can be exploited by the course designer in relation to the course objectives and what kinds of learning (comprehension analysis, application, problem-solving, inter-personal, mechanical skills, attitude change, etc.) are required.

Interactivity and user-friendliness: The extent to which a particular medium encourages interaction and active learning, and its user-friendliness is of utmost importance. Some technologies provide 'real-time' interactivity, whereas others are only asynchronous. Some are one-way interactive media, while others are two-way interactive. Since, the learner in distance education is at a distance from the teacher, the interactivity of the medium is of paramount importance. As far as the question of user-friendliness is concerned, it is the quality of the medium to provide control to the learner. For example, in a TV broadcast, the message just passes away and you can't go back to a specific frame. But in a video tape, you can just fast forward and rewind to understand a specific concept as many times as you want.

Organisational issues: The issues related to organisation deal with how to exploit the potential of each medium. The organisation must be ready to change and/or adopt new technologies relevant to its operation. Since technologies require additional cost, the organisation would like to effectively deploy both manpower and technologies to adopt changes. At the

time of taking a decision regarding technology, issues like how much training the staff would require to handle it need to be assessed. May be depending on the requirement, the overall organisational structure, job roles, etc. may need re-engineering.

Novelty: Bates recommends that novelty should be the least important of all the criteria. However, at times the novelty of the medium attracts funding from different agencies. But, you must be sure about the pedagogic utility of the medium before being fascinated by its novelty. And if the medium is not cost-effective, it will ultimately be a burden on the institution.

Speed: It relates to how quickly the medium allows the institution to make the shift to the new medium. Some technologies take more time for development. For example multi-media learning packages take more time. Even video tape takes lot of time to produce their audiotape. Also you must consider the speed at which the materials can be updated and revised.

1.3.2 Media integration

In order to make instruction effective for DE students, very often a multi-media approach has to be followed. Since various media have to be used in combination, it is necessary that one of the media should be the "master medium" and as and when needed, other media should be used so that the quality of presentation becomes maximally effective. Decisions regarding media integration are taken at the stage of curriculum design. Later on, when the courses are developed, various media are given their allotted role to play. Decisions about media integration hold good for course material as well as its delivery. Separate weight is given to various non-print media within the total weight earmarked for the non-print category. Suppose it is decided that 70% information will be presented to learners through 'print' medium and 30% through 'non-print' medium, then 'print' has the status of the master medium and the non-print media are to be integrated with it. The division of information to be carried through various non-print media has to be within the ceiling of 30% already allotted to the "non-print" category. The instructional material in the master medium provides instructions to learners when and how to use other media. Switch-over across media is thus well-integrated. The use of media other than the master-medium is decided according to the learning experiences and activities that are to be provided to learners. If learners are to carry out certain activities by themselves, then home experiment kits may be used. Let us study media integration through an example. The written text on a course on "Electronics" provides detailed description of the theory of oscillators in radio circuits and the function of each component. This is to be followed by practical sessions.

Table 8: Strengths and Weaknesses of Various Technologies

Media	Access	Costs/Students Nos.		Teaching		Interactivity		Organisat- ion	Speed
		Large	Small	Presentat- ion	Skills	Learning, Social Material			
One-way Media									
Print	Good	Good	Average	Average	Average	Average	Poor	Poor	Poor
Radio	Good	Good	Poor	Poor	Poor	Poor	Poor	Average	Good
Audio Cassette	Good	Good	Average	Average	Good	Good	Poor	Good	Average
Educational Broadcast TV	Average	Poor	Poor	Good	Average	Poor	Poor	Poor	Poor
Pre-recorded TV	Poor	Good	Poor	Average	Average	Average	Average	Average	Poor
Video cassettes	Good	Average	Poor	Good	Good	Good	Poor	Average	Poor
Computer based learning	Average	Poor	Poor	Average	Average	Good	Poor	Poor	Poor
Multimedia	Poor	Poor	Poor	Good	Good	Good	Poor	Poor	Poor
Two-way Media									
Audio Conferencing	Good	Poor	Good	Poor	Average	Poor	Good	Good	Good
Live Interactive TV	Poor	Poor	Poor	Poor	Poor	Poor	Average	Average	Good
Video Conferencing	Poor	Poor	Average	Poor	Average	Average	Average	Average	Good
CMC	Average	Average	Good	Poor	Good	Average	Good	Good	Good

(Source: Bates, 1995)

Activity

Based on the criteria of Bates, decide on a 'media-mix' for your institution. Provide reasons for each of your decision.

Integrated media use — Example 1

Text: You have learnt the theory of oscillators and their function in radio circuits. Let us now study how various parts of an oscillator circuit are put together. Switch on Section D of Videotape 2 and observe the demonstration of the process.

The learner switches on Section D of Videotape 2, and hears the speaker:

Videotape 2: Now you will observe how an oscillator circuit is assembled.

Section D The first thing to determine is the frequency for which we want to build the oscillator. Suppose the oscillator frequency is 450 kilo hertz. You have already learnt the value of circuit components for this frequency. Please refer to page 56 of your handbook circuit design-3. You should now do as I do. Please open your Home Kit 3. Take out the soldering iron and switch it on (The learner does as advised)..... check that your kit contains the following components. (Each component is first shown and named and the learner checks that he has these in his kit..... this goes on step by step and the learner carries out each step as shown).

Now your oscillator circuit is ready. However, its functioning has to

be checked. Connect the supply plug to the main socket. (The learner does so). Switches 'on' the main supply. The red pilot lamp should glow. (The learner switches on the supply end and checks the red pilot lamp)etc.

After the demonstration and practical experiments are over: 'Now you have learnt how to construct an oscillator circuit of frequency 450 kilo hertz and how to check its functioning. Please turn to page 58 of Circuit Designs 3 for review exercise on oscillator circuits.

(student turn to page 58)

Text: "You have now completed the practical activity No. 8 of preparing a 450 kilo hertz oscillator. Write answers to the following review questions on your Review Exercise Sheet No. 8..... etc.."

This was an example of media integration involving the use of print and videotape and practical activity using a house kit. The non-print media were integrated with the master medium i.e. print.

Hawkrige (1978) describes another example of media integration using print, TV broadcast, radio and practical activity:

Integrated media use — Example 2

"In a course on geology, the television ...camera zooms in to the specimens and later is attached to a petrological microscope. The students have in their home experiment kit a McArthur microscope (specially designed for the Open University) fitted with a polarise and analyser and can examine their own specimens and slides using the techniques demonstrated on television. In the comparison radio programme, the students are asked to examine nineteen rocks in the home experiment kit and to attempt to identify them as belonging to one of the three main classes of rocks igneous, sedimentary and metamorphic. They are encouraged to decide how large the grains are and of what shape and so on".

Media integration also involves some consideration of the learners' involvement i.e. at what point of instruction and in what manner should the learner be involved in the use of various media. This aspect of media integration, in fact, concerns "Involvement Editing". Active involvement of learners in various aspects of instruction is often necessary in order to (a) stimulate learners' questions, commentary etc; (b) seek various applications of instructional content; (c) make them react to various significant questions; (d) practice various skills; and (e) provide time cues to signal stopping points so that learners may switch over to another medium, use it as planned and then return to the first or the principal medium. In fact, the mere display of a medium can hardly be effective. Media are complex and therefore their application should be validated through successful learning events based on their use.

These examples show that judicious media selection and integration based on proper matching between education objectives, learning experiences/activities and educational media can make the learning process a lot more effective.

Check Your Progress 6

Notes: a) Space is provided below for your answer.

b) Compare your answers with those given at the end of this unit.

.Why is 'media integration' desirable in DE?

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1.4 MULTIMEDIA APPROACH IN DISTANCE EDUCATION

It is an accepted fact that the conditions of teaching-learning process in the distance education mode are different from those of the formal campus-based system. In DE, the learners and the teachers are not face-to-face except during the brief period of contact programmes. They are situated at a distance from one another. The organisation of DE does not provide for daily or often not even for weekly meetings between the teachers and the learners even when they reside in the same locality or city. Since the objectives of DE and formal education are more or less identical for a particular level of education, ways and means have to be found in order to ensure that student learning under the DE is comparable to that under the formal system. Various inputs like live lectures by teachers, regular and intense teacher-pupil interaction, explanations and clarifications made available by teachers on request from the learners, live demonstration of various techniques and procedures, model performance by expert teachers, guided peer-discussions, guided reading-assignments, individualised and personalised instruction, field trips and laboratory work are just not available to DE students, the DE organisations have, therefore, to be a lot more concerned about course planning and the development of instructional material. Lessons have to be written in such a manner that the need for seeking additional information and classification is minimized, if not entirely eliminated. Once the course objectives have been finalised, educational objectives in terms of the learner's behavioural changes have to be worked out. The process of course development and media selection is suggested in Figure 3.

In most cases, the principal medium is print. This could be attributed to two reasons:

- the suitability of the print medium for a variety of learning purpose.
- the exigencies of time-cost, resources and expertise available. In almost all the developing countries, distance education systems operate through print. However, there are institutions in the world where there is a systematic media mix. The UKOU provides a classic example for the integrated use of various media such as print, broadcast, face to face tutorials and practical. The University of Air, Japan and Central Radio

and Television University of China use the broadcast mode as the primary medium with print as the supplement.

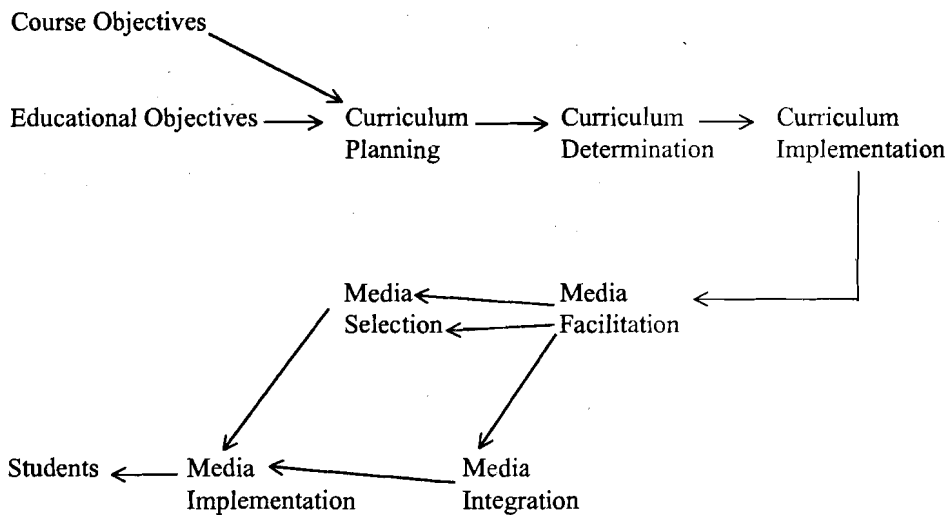


Fig. 3: Course development process in distance education

The Indira Gandhi National Open University as you might be aware adopts a multi-media approach to distance education, with print being the master medium. Figure 4 illustrates the kinds of educational media use in IGNOU.

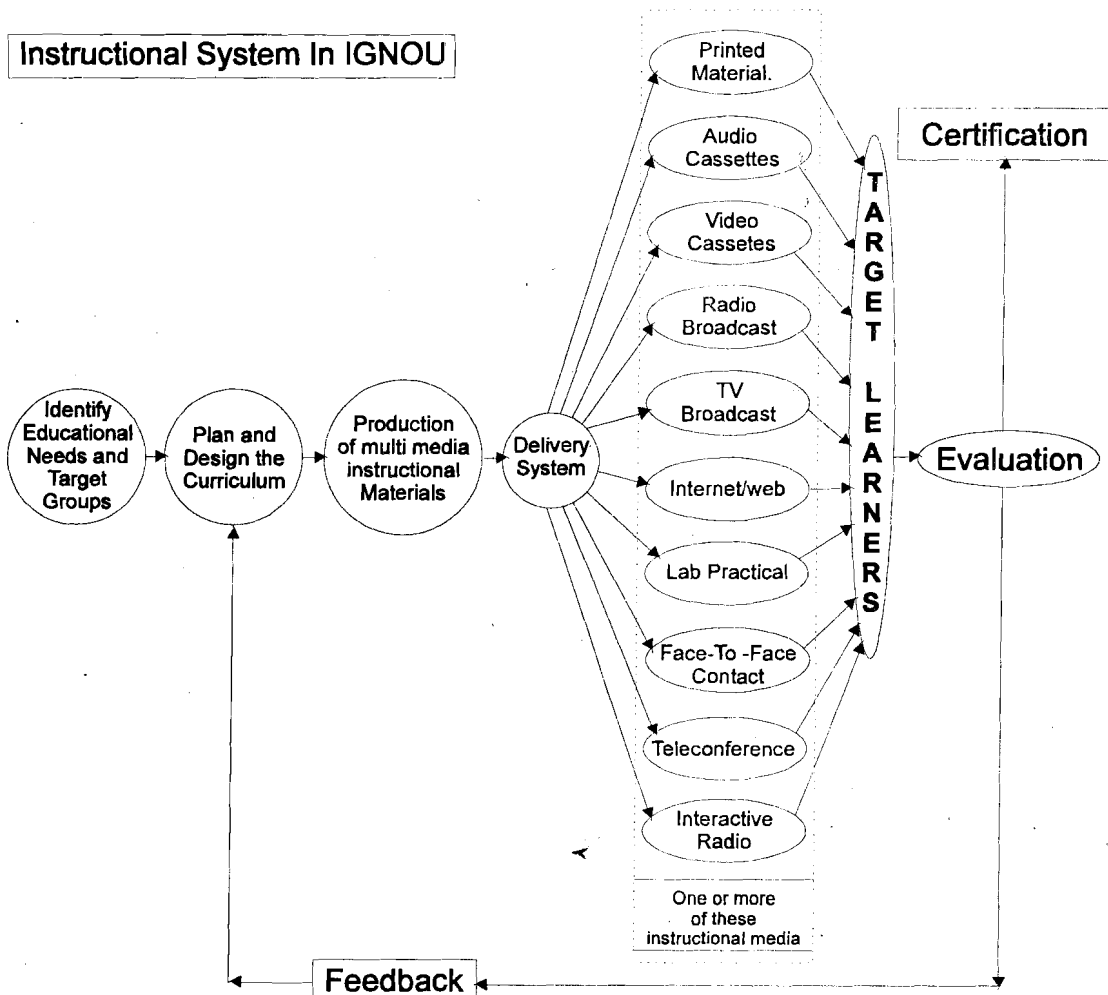


Fig.4: Multimedia approach of IGNOU

The approach is supplementary in nature, except for few courses that are offered in single medium through an independent approach. On an average for an eight credit course (one credit is equivalent to 30 hours of study time). Apart from printed text, 4 audio and 2 video programmes are produced to supplement text. Also 20 hours of face-to-face contact at study centre is provided to learners. However, it is optional. Apart from these broadcast radio, TV, interactive radio and teleconference too are provided at regular intervals. Normally the course development process goes through the stages as mentioned in Fig. 4.

Check Your Progress 7

Notes: a) Space is given for your answer.

b) Compare your answer with the one given at the end of this unit.

Briefly describe multi-media approach in distance education.

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1.5 LET US SUM UP

In a course that deals with the role and functions of media in teaching-learning transactions, the philosophical base — at once an explanation and a justification — for the use of media in the educational process has its legitimate place. This unit is an attempt to deal with this phenomenon. The focal points of this unit are as follows:

- The role of media in the DE context
- The classifications of educational media
- The merits and limitations of various media (print and non-print).
- Despite the various attempts to classify media, no scheme has been comprehensive enough to cover all the situations of media use.
- Hence the entire educational process depends on the effective use of various media. Distance education mode exhibits a greater level of complexity because it aims at cognitive, affective and psychomotor objectives. In order to achieve these, the DE mode uses print, audio/video components and various other kits.

- Media selection is the process of selecting such educational media for a course as are best suited to achieving various course objectives.
- The process of media selection is influenced by a set of consideration viz; effective communication, human factors, reasonable cost and practical considerations. We also discussed the ACTIONS framework of Bates.
- Media integration is the process of using various educational media in such a manner that they mutually support each other and make DE more effective. It involves choosing the principal medium and integrating the other media with each other and also with the principal medium.
- The unit ends with a brief account of the multimedia approach in the distance education context.

1.6 CHECK YOUR PROGRESS: THE KEY

- i) Educational media are base carriers of instructional information. In the context of distance education, educational media carry information from the institutions to learners situated at a distance and help them interact.
- ii) Romiszowski's scheme of media classification is based on the sensory channels involved in carrying instructional information. The four categories of educational media proposed by Romiszowski and their examples are given below:

Sensory channel	Examples
a) Audio	Radio, audiotape.
b) Visual	Silent film, film slide.
c) Audio- visual	Television, video tapes.
d) Tactile or kinesthetic	Working models, experiment kits etc.

- 2) i) Four major shortcomings of print medium are:
 - a) it is unsuitable for affective and psychomotor objectives;
 - b) it is time-consuming because it has to be processed in a linear-sequential manner; and
 - c) its language is fixed and usually based on literary skills of average learners.
- ii) Four features of the print medium due to which it is widely used in education:
 - a) Cheapest medium even today.
 - b) Provides most for cognitive objectives and in some measure for affective and psychomotor objectives.
 - c) Can be used at any time and place.

- d) Not dependent on any hardware.
 - e) Provides for more time to be spent on processing and therefore, results in more and better learning.
 - f) The only suitable medium for certain higher order cognitive skills. (Any four in any order).
- 3) i) Non-print media can supplement the print medium in areas and functions for which print is not best suited.
- ii) Three unique pedagogic uses of non-print are:
- decrease in psychological isolation of learners and make them feel part of a large system.
 - introduce variety and heighten learner motivation.
 - ideally suited to presentation in enactive and economic modes of experience.
- 4) In complementary pattern, the decision regarding the extent, area and components of media use are taken at the syllabus-framing level. In supplementary pattern these decisions can be taken at a much later stage. The crucial distinction here is in the forms, the media component is an integral part of the teaching learning transactions. In the latter, it is an addition used for enrichment and supplementary learning.
- 5) i) Four educational media for cognitive objectives are:
- a) Print — by providing handouts, worksheets, textbooks, reading assignments etc.
 - b) Transparencies — used by tutor/teacher for explaining complex ideas, and problem solving especially those requiring non-verbal illustrations.
 - c) Individualised instruction — through computers; video tape etc;
 - d) Television — through demonstration of problem solving skills in problem situations.
- ii) Four educational media for developing psychomotor skills are:
- a) Television — the demonstration of procedures / processes.
 - b) Radio/audiotape — through a step-by-step description so that learners perform whatever they listen to.
 - c) Print — step-wise description of how to things or perform tasks;
 - d) Tutor — The demonstration or the 'Do as I do' mode.
- 6) Media integration is desirable because it helps the teachers and learners overcome the constraints of distance education mode.
- 7) In face-to-face situations as available to a learner in the formal education system, there are several inputs like lectures, intense pupil-teacher interaction through question answers, discussions, practical demonstrations of techniques and procedures, guided reading

assignments, field trips, laboratory and individualised and personalised instruction. All these are almost missing in DE because here the teacher and learner are separated from each other. To compensate for this drawback, distance education of necessity relies on the use of variety of media — TV, radio, films and other inputs — to enhance and sharpen its effectiveness. Such a multi-media approach has got to be planned and adopted carefully and purposefully.

UNIT 2 RADIO AND AUDIO COMPONENTS

Structure

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2.0 INTRODUCTION

Today we live in a society in which instantaneous, world-wide communication through electronic media (i.e., television, radio, audio and videocassettes, computers, satellite, films, etc.) has become common. The very pervasiveness of these new technological devices in our lives, however, tends to obliterate the fact that this is still a relatively new phenomenon for us — at least for those of us who live in the developing countries. They are so much taken for granted that many of us are rather too complacent about our knowledge of their potential uses in instructional situations. These sophisticated communication devices and their applications for effective learning have already opened up several instructional options for distance education teachers and learners. It is essential, then, for us to learn of their potential uses in instructional situations.

Distance teaching is basically a multi-media process but most distance education institutions rely on print material as a master medium complemented or supplemented by other media. In this era of technological

revolution, the distance education systems need to outgrow this dependence on print material to become more efficient and effective.

The radio is the cheapest and the most easily accessible of the other three electronic media, i.e. audiocassette, television and videocassette. No doubt, its potential audience is very large in comparison to the audience of other mass media. It caters to people of different ages and levels of maturity ranging from a primary school child to grandfathers. Besides the cost-factor and the wide-ranging appeal, another reason for its popular use is the fact that it is easy to handle. While all these attributes make it a wide-reaching means of mass communication, it has a pedagogically strong reason for its use in education and that is its versatility. The radio lends itself to serve different purposes. For instance, while it provides learners with new joys of learning, it can develop their command over vocabulary, promote concentration and critical listening, and improve fluency and confidence in speech and discussion. It can be used for formal and non-formal education. Its broadcasts can be designed to supplement/enrich the formal school subjects. These broadcasts may clarify a concept, or give additional views on a theme, or provide further illustrations and case studies related to an issue. Broadcasts under non-formal education may comprise programmes relating to children, women, adult education, rural development, social action, etc. These programmes help equalise or enlarge educational opportunities. With a brief overview, at the start, of the non-print media, the major portion of this unit will focus on the development, potentials and future trends and role of educational radio and audio components in education.

2.1 OBJECTIVES

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

- describe the origin and growth of radio in India as a case in point;
- discuss the potential and use of radio/audio medium for education and development;
- distinguish between the educational potential of the radio broadcasts and audio cassette technology; and
- explain measures to ensure optimum learning from the radio/audio medium.

2.2 ORIGIN AND GROWTH OF RADIO IN INDIA

It was a great invention that human voice could be transmitted by electromagnetic waves over long distance without the help of a wire. The radio, which arrived in the first quarter of 20th century, ushered in a new age in the area of communication.

From being the mere curiosity of the early experiments by the radio clubs in Madras (now Chennai) and Calcutta in the 1920s, radio in India has come of

age and is one of the biggest networks in the world. The first radio station of the Indian Broadcasting Company (IBC) at Bombay (now Mumbai), formally inaugurated by the then Viceroy of India, Lord Irwin, on January 23, 1927, heralded the beginning of organised broadcasting in India. Interestingly, this was the year in which the British Broadcasting Corporation (BBC) was formed. The IBC was liquidated in 1930 giving way to the Government controlled Indian Broadcasting Service, which too was closed down on October 9, 1931, due to financial constraints. On popular demand on May 5, 1932, the Government finally decided to run the service under state management. On June 8, 1936, the organization was re-named All India Radio. Some princely states like Mysore (September 10, 1935) — which incidentally designated its radio station as Akashwani, Baroda, Hyderabad (February 3, 1935) Aurangabad, and Trivandrum (March 12, 1943) also opened radio stations. From 6 stations (Bombay, Calcutta, Delhi, Madras, Lucknow and Tiruchirapally) at the time of the partition, AIR has grown to more than 179 stations today.

As of today AIR network broadcasts nearly 2000 programme hours every day in 24 languages and 146 dialects. It reaches 97.1 per cent of the population, which includes substantial population in rural area, and covers 89.7 per cent of the geographical area of the country. The AIR is expected to cover an estimated 97.7 per cent of population in the country on completion of various ongoing projects under the 8th Five-Year Plan. Let us now briefly describe some of the main radio projects, which signify the growth of educational radio in India over six decades.

2.2.1 Some major educational radio projects in India

The history of educational broadcasts in India is almost as old as the history of Indian Radio or AIR itself. Here, we provide a brief summary account of a few major radio projects undertaken in the field of educational radio:

i) School broadcasts

Even before the AIR came into existence there were occasional broadcasts for schools from Bombay and Calcutta. It was only in 1937 that organised school broadcasting started in Calcutta. Funds were allotted to schools to buy radio sets. Out of enthusiasm, the AIR authorities embarked on schools programmes from Delhi, Calcutta, Madras and Bombay without waiting for schools to acquire radio sets. In the beginning, the school programmes were not strictly governed by the curriculum. With the passage of time and the acquisition of more experience, the AIR tried to make its radio broadcasts more curriculum-oriented but in the absence of common syllabi and time tables in schools, even within the same state (leave alone schools across the country), it could not succeed in this aim.

The AIR is assisted by various agencies in planning their educational programmes, particularly programmes for the young — primary and secondary level students. For example the Central Institute of Educational Technology (CIET), a wing of NCERT and some other such institutes in

states regularly produce programmes for primary classes and these programmes are broadcast by different stations of the AIR.

ii) *Adult education and community development project*

In 1956 an attempt was made to communicate with rural people through broadcasts. The programme was called 'Radio Forum' and was tried in 144 villages in the vicinity of Poona. This kind of programme was originally designed and tried out in Canada. With the help of UNESCO, India decided to try it and 'Radio forums' (defined as a 'listening-cum-discussion-cum-action group') of villagers of about 20 members each were organised in every one of the 144 villages. The members were to listen to thirty-minute radio programme on some agricultural or community-development programme, then discuss and decide whether to take any action on it in their own village.

The project was a great success. Many action programmes were planned and put into practice. Members of the forum learned a great deal from the radio showed a substantial gain in processing information and contributing to constructive discussions.

iii) *Farm and home broadcasts*

To improve the effectiveness of radio programmes in rural/social change, the AIR initiated the farm and home broadcasts in 1966. These broadcasts were designed to provide information and advice on agricultural and allied topics. The aim was to educate the farmers and provide them assistance in adopting innovative practices in their fields. The broadcasts under this programme are of immediate local relevance. They are directly linked with the day to day agricultural practices of the farmers. The officials also conduct occasional farm radio schools and these schools have proved to be very effective.

iv) *University broadcasts*

Radio programmes on subjects of academic interest have been broadcast from AIR stations from the very beginning of organised broadcasting. In 1965, an attempt was made to assess the impact of these broadcasts on students and it was found that there was little interest among students.

However, it was believed that the desire to expand higher education as widely as possible among the different strata of society could be fulfilled through the use of educational radio broadcasts. Consequently two types of programmes — 'general' and 'enrichment' — came into existence. While general programmes include topics of public interest, the enrichment programmes support correspondence education offered by universities in their respective jurisdictions. Responsibility for planning the courses rests with the academics, while the radio stations in consultation with the universities arrange broadcasting. In Delhi, the correspondence school of the University of Delhi works out the details (such as curriculum, scripting, broadcast schedule, etc.) in consultation with the AIR to provide possibilities of using radio for its courses. The Central Institute of English

and Foreign Languages, Hyderabad is known for preparation and broadcast of its programmes in teaching of English through AIR.

v) **Language learning project**

In 1979-80 the AIR conceived of and implemented an experiment to use radio broadcasts for language teaching. The experiment was conducted in collaboration with the Department of Education, Government of Rajasthan. Under this experiment an attempt was made to teach Hindi to school going children as their first language. The experiment was called 'the Radio Pilot Project' and it aimed to cover 500 primary schools of Jaipur and Ajmer districts. The projects were found useful to the children and research studies have revealed the contribution of the project to the improvement of the vocabulary of children. Later, it was repeated in Hoshangabad district of Madhya Pradesh with some modifications and a limited success.

1.2.2 An overview of the development

The development of educational radio in India has two sides to it:

- i) the establishment of the broadcast network, and
- ii) the preparation and production of specific educational programmes.

As far as the broadcast network is concerned, the AIR has made a tremendous achievement having managed to reach as much as about 90% of the population of this large country. It is a matter of pride that it is one of the largest networks in the world.

As for the educational programmes, the broadcast-projects that we discussed in this section suggest how efforts had been all along towards both formal and non-formal education. Broadcasts of formal education (as the discussion on school broadcasts and university broadcasts suggests) were too general to begin with, but have gradually become increasingly specific. The attempt to make school broadcasts more curriculum oriented and the attempt to make university broadcasts supplement the correspondence education have made the educational radio more purposeful and specific.

The broadcast programmes of non-formal education of the AIR have recorded tremendous success in achieving worthy objectives in the areas of agriculture and rural development.

Activity

For Indian students

Find out how educational radio is being used by open universities in India. Develop a case description of any one open university using radio. For this activity try to make use of your nearest library or any other source.

For other students

Find out the use of educational radio in your country. Discuss any one educational radio project in detail. For this activity, you may use your nearest library or any other source.

2.3 AUDIOTAPES AND OTHER DEVELOPMENTS

Some devices of independent and/or accessory function have come into use along with the radio in the recent years. These are sometimes called extensions of the radio medium and have become popular because they help us overcome some of the weaknesses of radio broadcasts — like the availability of broadcasts on scheduled times alone. Besides, these devices have also been cheap enough to be within the reach of a considerably large proportion of the population. According to Rowntree (1994:11) the purposes of using audio in teaching could be outlined as follows:

- To provide “aural source material” — e.g. a conversation with a client or college — for the learner to analyse or react to.
- To breathe life into ideas presented elsewhere in the course.
- To talk to the learners through tasks during which it would be disruptive for them to keep consulting written guidance.
- To help the learners practise skills.
- To make the teaching more human and personal.
- To say things which are not so easily expressed in print.
- To encourage or motivate the learners.
- To influence the learners feeling and attitude.
- To get worthwhile contributions to the teaching from people who would be unlikely to contribute in writing.
- To let learners hear the voices of experts users, clients, other learners, etc.
- To present new ideas to learners who are unable or unwilling to read or whose circumstances prevent them from reading.
- To provide necessary variety in the learners’ learning process.
- To act as a trigger for group sharing of ideas and experience.

We discuss in this section four such devices from the point of view of their pedagogical uses. We talk about ‘radio-vision’ first and then discuss the audiocassette device.

2.3.1 Radio-vision

Pioneered by the BBC, the technique of radio-vision allows the subject-matter to be presented through two channels, the audio and the visual. The visuals are presented in the form of still filmstrips, charts, slides, models, etc., while the explanation is given through recorded narration. This is used by educational institutions as a substitute for educational television. Radio-vision has its own advantages:

- It is economical

- It can cater to different categories of learners
- It is easy to produce such programmes at the institutional level or at the learning centres
- It provides visual support to the concept that is taught.

A small experiment in the use of radio-vision technique was carried out by The National Council of Education Training and Research, India in 1975-76, using it as one of the components of the multi-media package for in-service teacher training designed and operated during SITE. A series of charts and picture-cards were presented to about 24,000 participating teachers 2400 centres alongwith verbal explanation provided through specially prepared radio broadcasts. The results were found to be encouraging.

2.3.2 Audiotapes

Audiotapes can overcome some of the limitations of radio broadcasts. An audiotape provides considerable freedom to the learners who can use it at any time and place of convenience. The learners can replay the tape any number of times and review the taped material over and over again, even using the stop-start method. The audiocassette also permits a degree of privacy and confidentiality which is not possible through radio broadcasts. The audiotape is comparatively inexpensive, simple to operate, flexible and operate. It is a good learning device. We shall discuss more about audiocassettes further in this unit.

2.3.3 Audiovision

Similar to radiovision, audiovision is use of audiotape along with visual media. This format becomes extremely useful when you want the learners to study a series of photographs, follow a sequence of steps, consult a table, examine a map, etc. Through audiovision you can even conduct field experiments, and even ask the learners to observe actual objects/specimens. This indicates that audiovision takes into account both "listening and looking". According to Rowntree (1994) audiovision can be made more active by asking the learners to do any of the following activities:

- writing comments or calculations
- completing a form or questionnaire
- using materials
- operating a model
- carrying out an experiment.

2.3.4 Radiotext

Radio has been used along with textual data transfer via computer networks simultaneously to create a 'radiotext' environment. The teaching end is normally a FM radio station having data broadcast facility through a computer network. The main points of the radio broadcast are sent through

textual mode to the receiving end via a computer network. The learning end has radio listening facility as well as a computer screen to receive the textual data. Since both audio and text are broadcast simultaneously, the learner at the receiving end gets high quality and low cost teaching. An experiment on the use of radiotext at Yashwant Rao Chavan Maharashtra Open University, Nasik, India resulted in the satisfaction of more than 80 per cent the learners. It also used a peer group discussion at the receiving end after the broadcast, which indicates radiotext could be used for varieties of objectives (Chaudhary, 1997).

2.4 STRENGTHS, LIMITATIONS AND USE OF RADIO/AUDIO MEDIUM

From its very inception, the radio has been and is being used to serve a variety of purposes: to inform, to educate and to entertain people. Continued technological innovations have made radio broadcasting increasingly available to a large number of people throughout the world. Besides the radio can and does play an increasing role, especially for those who cannot read, are physically isolated or are visually impaired and have little hope to afford the television and other expensive electronic gadgets. The radio is a means to reach and teach those persons who do not have access to other sources of information and educational communication.

2.4.1 Strengths of radio/audio medium

The potentials of radio broadcasting stem from two sources:

- its low capital requirements, low operating costs and wide coverage
- its pedagogical values.

Some characteristics that contribute to its potential are listed here:

- i) Easy accessibility:* In comparison to other media, radio is accessible to the majority of our countrymen. Low cost transistors within the easy reach of even the economically weak classes of people are available in the market. It can, therefore, be used as a home-based means of imparting education.
- ii) Wide coverage:* Today we cover a major portion of our territory by radio broadcasts as the broadcast facility is available throughout the sub-continent. As such, the radio can extend learning at a distance as it can easily and quickly reach the isolated rural audiences.
- iii) Low capital investment and operating cost:* Radio technology is comparatively cheap. In terms of installation and production of radio broadcasts it is quite economical and needs less production facilities than the other electronic media.
- iv) Easy learner-reception:* Radio broadcasts can be listened to even while one is doing some manual work. Distance learners can listen to programmes whenever they desire to and from wherever they are.

- v) **Effective thought promotion:** Radio taps the thinking process of the learner as listening is invariably accompanied by simultaneous information processing. It can also stimulate a listener's imagination with a tactful use of music or the technique of pauses.
- vi) **Motivative supportive facilities:** Broadcasting can make education interesting and enjoyable, when it is used imaginatively. The feeling and motivation of listeners can be stimulated directed by music and other sound effects.
- vii) **Easy production:** Production of creative radio programmes is simpler compared to a TV or video programme production. No complicated mechanism or any sophisticated instruments are needed for such production. It requires less manpower too, compared to the production of a television/video programme.
- viii) **Effective-creation/transmission of reality:** A powerful 'audio' version brings a scene into sharp focus and also establishes 'movement' effectively. A live broadcast can make listeners share the experience of a scene of reality taking place, say, some 100 miles away. It can also make listeners partake of an experience of a scene of the past that took place, say, some 100 years ago.
- ix) **Feasible mode of learner-enrichment:** The most common function of media in education is 'enrichment'. This function is easily materialised with the help of radio and with relatively little expense.
- x) **Direct instruction:** The use of radio for direct instruction has been tried. This, however, demands intensive and systematic use of the radio. Under such schemes syllabus based programmes are broadcast for definite target groups.

2.4.2 Limitations of radio/audio medium

The radio has its drawbacks too. We can summarise the limitations of radio as a medium of instruction as follows:

- i) The radio is not a flexible medium. There is no face-to-face interaction, dialogue or discussion between the listener and the speaker/producer. In the absence of motivation, guidance and supervision, the atmosphere for learning is not very conducive and the teaching/learning process becomes a one-way transit of information.
- ii) The doubts/queries arising in the mind of a learner cannot be attended to immediately. Thus there is no provision for immediate feedback to the learner; nor is there any feedback on the quality of the content.
- iii) It may not be an effective medium for all types of course materials; for example, the subjects which need demonstration/visual illustrations cannot be taught effectively through radio.
- iv) There is a dearth of adequately qualified personnel for producing worthwhile educational programmes. Radio programming demands experienced and creative personnel with both production and academic

background. It is difficult to find persons with experience along the lines. When persons from either lines are chosen to work jointly, co-ordination within the team becomes difficult; and in the absence of co-ordination the quality of the output suffers.

- v) Educational radio programmes have not been given adequate and appropriate broadcast time-chunk. This phenomenon causes inconvenience to learners as they have to make themselves available during the scheduled broadcast time whatever be their engagements at the moment.
- vi) In most developing countries, educators have to plan programmes for heterogeneous masses (such as the illiterate, school dropouts, the unemployed, etc.). The more heterogeneous the audience, the more difficult it is to produce a radio programme of common utility/appeal.
- vii) The span of attention of a learner is short and thus, the retention of factual information given after the first few minutes of the start of the programme is generally low unless some special efforts are made to reassure attention from time to time. Furthermore, educational broadcast is not a priority area of programming in the radio set-up.
- viii) The technical staff concerned with the planning and production of radio programmes often lack adequate knowledge of the relevant pedagogical needs of the learners and their characteristics. The subject experts do not have any deep acquaintance with the complexities of programme production. So unless there is a perfect co-ordination and understanding between the two groups, no good production could ever be achieved.

Check Your Progress 3

Notes: a) Write your answer in the space given below.

b) Check your answer with the one given at the end of this Unit.

List at least five advantages of educational radio.

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2.4.3 Uses of radio/audio medium

The radio as a medium of mass communication is very strong as it can reach every corner of the country or even the entire globe instantaneously. At the same time it is an illusive medium with words disappearing into thin air. Its immediacy and comparative simplicity gives it an edge over the other media in imparting information, education and entertainment. All this is done with three essential inputs, namely, human voice, sound effects and music. What

the radio actually does is interpersonal communication, which should have a relaxed and conversational style. A programme may be meant for a large mass of unseen audience but in effect it is directed towards a solitary listener. Though every bit of information that is broadcast is generally written, it is written for the ear and not for the eye. Again, it is written to be spoken and not to be read. Being a one chance medium, what is written and read or rather spoken should be comprehensible when heard just once.

The radio, being an aural medium, can be used as an effective instrument in instructional technology and educational system. In using the radio, one needs to choose the most effective broadcast and presentational techniques and constantly evaluate results for further improvement. Radio broadcasts can help the students in the process of their learning, stimulate their interest and kindle their imagination. Further, radio broadcasts add variety to the methods of teaching. Because it is a uni-sensory medium, i.e., sound only, it may not be suitable to teach all subjects, especially when it is used, as a direct teaching method. Of course, with supplementary materials, it can serve the classroom as an enrichment programme.

The radio is being used for both formal and developmental education. In fact, most radio programmes have an element of education as they can motivate people to learn new skills, accept new ideas and change faulty attitudes. Let us discuss in brief the use of the radio for both formal and developmental education.

Formal education

For our purpose we define formal education as follows. When the radio programme is part of a well-defined curriculum (i.e., as a part of a course of study) for which students are enrolled, their progress is monitored and evaluated, and a certificate is awarded on successful completion of the course, the approach is termed as formal education. The radio is used to impart formal education in many countries around the world.

Jamison and McAnany (1978) analysed various educational radio projects conducted in various countries. They concluded that, in general, the radio is used to achieve the following four broad objectives:

- i) Enrichment of learning, i.e., giving additional experience to the students, particularly in those areas where the teacher finds it difficult to teach. Use of the radio in India at the primary level of education is for enrichment. The radio is used to supplement the primary school curriculum. This use is easy to implement.
- ii) Direct instruction, i.e., carrying the major portion of the instructional burden of a teacher's teaching. A certain portion of the syllabus is taught through the radio and the teacher takes care of the rest. This is a more extensive and systematic use of the radio. The main objective of this use of the radio is to improve the quality of classroom instruction. Nicaragua's Radio Mathematics Project makes tremendous use of the radio for instructional purposes.

- iii) Extending in-school education, i.e., extending the facilities of education to remote and scattered populations, and thus replacing a classroom teacher by the radio. The radio instruction is used to extend school instruction to those who want it. For instance the Mexico's Radio Primaria (1969) was designed to extend access to elementary schooling in the rural areas of Mexico.
- iv) Distance learning, i.e., combining the radio with other media, particularly with the print medium and occasional personal contact sessions, and thus completely replacing both the teacher and institution. The developed countries — UK, Australia, Canada and Japan, make extensive use of the radio for teaching at a distance. China, Thailand and Kenya have many years of experience with the radio correspondence approach to learning. Radio Santa Maria is a successful example of distance teaching. Under this programme, primary equivalence degree is earned in home-study with the help of radio by individuals who failed to attend school-based education. We too are making use of the radio for distance education in India.

Formal education through the radio is imparted in two forms — through radio broadcasts and through audiocassettes. Both the forms are used in pedagogic transactions in India too. The programmes belong predominantly to the cognitive area. Subjects such as language, social studies, sciences and mathematics are broadcast through the regular radio network.

Several studies conducted in India have revealed that languages can effectively be taught through the radio. A project entitled the Radio Pilot Project, for instance, was started jointly by the Department of Education (Government of Rajasthan), AIR, Jaipur, and the NCERT, Delhi. The aim of the project was to teach language (Hindi) to the primary school children. The radio programmes were planned as part of a package, which included the print materials and classroom teacher support. The support services helped teachers in organizing pre-and post-broadcast activities. Studies conducted by AIR showed that all the teachers, who were given the responsibility to arrange listening, unanimously accepted that the role of radio programmes in promoting the students' knowledge of Hindi was significant.

Similarly, radio programmes are being broadcast for secondary school students. Many radio stations in India broadcast the programmes based on the secondary school syllabus during school hours.

Some directorates of correspondence courses of the conventional universities made use of the radio broadcast for their students. For instance, AIR, Delhi broadcasts programmes produced for the students for the Directorate of Correspondence Courses, University of Delhi; AIR, Jalandhar broadcasts higher education programmes for the correspondence students of the Punjabi University. Similarly, AIR, Tiruchi is engaged in producing and broadcasting programmes for the students of the Madurai Kamaraj University. Some other universities are also engaged in planning, producing and utilising radio programmes for their students.

Some universities/institutions, such as the Central Institute of Educational Technology (CIET), are equipped with programme production facilities. Such institutions produce programme for specific target groups. In some cases, the universities provide content inputs, and programmes are produced and broadcast by AIR.

IGNOU is engaged in planning, producing and evaluating both radio broadcasts and audiocassettes for its students. Not only are the radio programmes broadcasted directly, but these are recorded on tape for use as and when required. From the very beginning, audiotapes have formed part of the IGNOU course materials. These cassettes are not mailed to the students but are made available at the study centres, which are opened for the students on weekends and holidays. The students listen to the audiocassette in groups and in the presence of an academic counsellor. The academic counsellor is to undertake pre-and post-listening activities. One of the advantages of group listening is that students can discuss the content of programmes with their fellow students and learn from peer group interaction. These programmes are used to supplement the printed text mailed to the students.

Developmental education

In developmental education, the information passed on to the audience may not be a part of any prescribed curriculum. Development is a widely used participatory process of directed social change in a society, intended to bring about both social and economic change. The use of the radio for development education is quite popular in the developing countries. From the beginning, the radio has been used throughout the world for development education — social, political, cultural and economic.

The radio is considered a powerful, direct force for development. It acts as a one-way, linear, transmitter of developmental messages from the governmental agencies to the people. The developmental radio programmes are transmitted under regular broadcasts. The topics of common interest and those which need media support are taken up for discussion. The major chunk of existing radio broadcasts is developmental in nature.

The main goals of developmental education are to sensitise people about their problems and motivate them to find a common solution. These may be to increase agricultural production, to improve general health of the people, to fight against social evils, to eradicate illiteracy, to impart social education, and so on. Jamison and McAnany (1978) give the following three major objectives of the radio developmental education:

- i) *To inform:* The radio has far greater access to the remote areas. This feature of the radio helps the messages reach a large number of people. Regular radio news cover issues related to international and national affairs, about availability of social services, disaster warning, etc. Thus, the radio has the potential to improve the access of developmental messages to an unlimited audience.
- ii) *To motivate:* One of the major objectives of radio programmes is to motivate people for socially desirable behaviour. The radio

programmes are aimed at improving the quality of life, to motivate the listeners against social evils such as drug addiction, and so on.

- iii) *To teach:* The radio helps coordinate delivery of educational services. It helps teach simple skills — vocational courses such as those on food and nutrition, the preparation of pickles, biscuits and so on. One of the important functions of the radio broadcast is to make people literate. Radio Santa Maria launched the radio literacy programme in 1964. Thousands of adults participated in and benefited from the literacy programme.

AIR broadcasts a variety of programmes for the children. Besides programmes related to their school education, programmes on health, hygiene, national integration, etc., constitute the broadcast fare for children.

For the youth, programmes of general interest are discussed on the radio. The main objectives of these programmes are to develop socially desirable behaviour in the youth, to bring them into the national mainstream, to make them productive, etc.

Programmes on agriculture and allied subjects, health and hygiene, social education, mass literacy, etc. are broadcast for the adult listeners. Farm and home units of AIR produce programmes for the rural listeners.

There are special programmes for the teacher broadcast by many of the radio stations. The objectives of these broadcasts are to upgrade teaching skills, to make teachers aware of innovations in teaching methods, curricular changes, new additions to knowledge and so on. To update their knowledge, programmes on various subjects are broadcast on the regular radio networks.

In the light of these details, it is easy enough for us to conclude that the radio is used for both formal and developmental education. Most of the radio programmes as you have just seen, fall in the category of developmental education which primarily aims at bringing about socio-cultural and economic changes in society.

Check You Progress 2

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the Unit.

Define the objective and scope of radio developmental education briefly.

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2.4.4 Cost of radio programmes

Experiences in radio-based instruction show that there is a wide scope for the use of the audio medium in a variety of courses. The amount of work and the cost involved in planning, producing and implementing the audio programmes are likely to be similar to those involved in developing printed learning texts. Even the nature of the work is largely similar at the stages of planning, researching the topics, drafting, editing, etc. (Grudin, 1984).

When we compare the cost involved in producing audio programmes with other media, we find that the audio programmes are a cheaper option. A radio costs roughly one tenth of a television set.

The cost of producing a master programme varies, depending on the nature of the content to be discussed and the facilities available at the open universities. Once the master programme is ready, it can either be broadcast directly or duplicated on blank audiotapes.

There are two more factors that determine the costs involved. If the radio programmes cater to a large number of students, the cost per student of programme production will be very low. Equally important, as far as the cost of the radio programmes is concerned, is the life of a programme. If a programme, with some slight revision or improvement can be used over a long period of time, it will prove cost effective.

We should also take the programme's affordability into consideration. A student has to buy a transistor or an audiotape recorder, and he/she has to spend on batteries or electricity to listen to the radio programmes.

So far we have discussed a number of areas where the radio is used in India and elsewhere in the world. But the use of the radio in the Indian education sector is not satisfactory. Much is required to tap the potential of the audio medium for both education and developmental communication. We quote here the experience of Singhal and Rogers (1989):

...but the development potential of radio in India is largely unrealised. More than any other mass medium, radio has the potential to offer programmes to villagers in a language they can understand and that deals with their day-to-day problems. But unfortunately, the growth of Indian television in the 1980s has forced radio to take a backseat.

Do pause to think about this. What does your own experience tell you?

2.5 AUDIOTAPES IN EDUCATION

We discussed radio broadcasts in the previous section. The master programme produced is directly broadcast for the target audience. We have also discussed some of the limitations of the radio broadcast. Now let us see as to how far we can overcome these weaknesses by making use of audio cassettes/tapes.

In audiocassettes, the focus is on pre-recorded sound delivery in a more permanent form than in a transitory radio broadcast. Thus the word

'cassette' becomes significant. A cassette is a device on which information is stored for the future and repeated uses.

The use of audiocassettes got underway in India in the early 1980s. In the mid 1980s, the Governments of India's liberal electronic policies encouraged collaboration with the developed countries, specifically Japan, for manufacturing audiocassettes. As a result thousands of audiocassettes were sold in the Indian market. Indigenous industrialisation gave a boost to the audiocassette industry by manufacturing thousands of audiocassette recorders.

The audiocassette recorder is more an urban phenomenon, and is generally used to listen to music. Most audiocassettes in circulation in India contain music — classical, popular and film music. This means that the audiocassette is not used for or is not popular as a means of education in India. IGNOU is perhaps the first institution where the audiocassettes are used for educational purposes on a large scale.

Depending on your experience, can you compare the educational effectiveness of the radio broadcast with that of the audiocassette? Of course, you will find that the audiocassettes have an edge over the radio broadcast. We may argue in support of our viewpoint as follows:

- Unlike the rigid radio broadcast, the audiocassettes present considerable freedom to the students, they are free to choose to listen at a time and place convenient to them. The audiocassettes are at their disposal to be made use of. Thus, the audiocassette satisfies their individual needs more effectively as it suits their convenience.
- The technical facilities/devices — stop, pause, replay — are available with audio cassette players. These devices facilitate studies according to learner's requirements. One can study according to one's style of learning and individual pace. Learning through audiocassettes is not time and space bound. The students can use a cassette time and again until they master the content of the programme. It implies that even high level content, which needs special efforts on the part of the students, can be discussed on audiocassettes.
- The students can browse, skip and review certain learning tasks or activities. Thus, the audiocassettes give the students the facility of selective reading. These features of the audiocassettes offer all the advantages of the printed text.

If you review all the three points given above, you will observe that the main point that emerges is the *control*, which the students enjoy while using the audiocassettes. The students have more control over their learning and proceed according to their individual pace and needs. The broadcast programmes could fail to meet the students learning needs — individualisation, self-pace, selective reading and so on.

Check Your Progress 3

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

b) Compare your answer with the one with given at the end of this Unit.

Give three advantages which audiocassettes have over radio broadcasts.

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2.5.1 Designing programmes on audiocassettes

The special features of the audiocassette technology have some bearing on its design. While designing a programme on audiocassette, we have to keep its specific features in mind. That is, we should exploit the specific uses/potential of audiocassettes. By doing so, we can overcome some of the weaknesses of the radio broadcast and printed text.

Following are two important points that should be taken care of while planning and producing the audiocassette programmes.

- To make learning interactive, we need to incorporate some activities in the programmes. That is, an audio programme should be so devised as to ensure the students' participation in the teaching-learning process. In-built activities can be presented in a variety of ways. A discussion can be interrupted with activities and questions, which helps the students learn concepts, solve problems and recapitulate important/difficult learning points. The design of the audiocassette presentation should allow for such pedagogic activities.
- One of the education potentials of the audiocassettes is to help the students acquire practical skills. Therefore, the audiocassette should provide time and scope for the development of skills such as drawing of graphics/diagrams, setting up of equipment etc. In each case, commentary can provide an essential and supporting voice as the students set about their work (Durbridge, 1984). To achieve these objectives, we, however, need to follow the multi-media approach in teaching.

2.5.2 Combining audio programmes with other media

In comparison to other media, it is easy to integrate audiocassettes with any other medium of instruction. Integration of audiocassettes with the printed

text can be so effective that optimum learning can be achieved. This approach has proved very popular with the British Open University students. Various subjects, including Engineering and Science are being taught with the help of audiocassettes integrated with the printed text, which is presented in the form of illustrations and diagrams in a sequential order, and each illustration is supported by a powerful commentary. Illustrations in the form of visuals are presented frame by frame, and each frame is supported with voice that is, the sound track complements the visuals to enhance their effect.

2.5.3 Cost of audio-cassettes/programmes

The procedure of preparing master tapes is the same for both the radio broadcast and the audiocassette. Once the master tape is ready, it can be either directly broadcast or transferred in the form of audiocassettes. So the costs for preparing programmes for the radio broadcast and audiocassettes are almost the same. In the case of the audiocassettes, the institution has to purchase blank audiocassettes and get the master tape duplicated. The audiocassettes can be either mailed to the students as part of their learning material or made available at the study centres where the students can make use of the programmes they need. In either case, it depends on the costs and accessibility of appropriate technology to the students. As a distance educator, you have to ensure that the teaching media you intend to use are accessible to the majority of the students. You have to ask yourself whether the radio is accessible; whether audio cassette players are available with the students; whether the study centres you are planning to equip with the audiocassettes are within the reach of the students.

To make use of the audiocassettes at their workplace, the students have to buy an audiocassette recorder. Moreover, they have to invest in buying batteries or paying electricity charges. Thus the total cost of producing and utilizing the audiocassettes includes both the institutional and individual expenses.

We may conclude from what we have discussed in this section, that we have yet to exploit the total potential of the audiocassette tapes in education. This method allow the students to learn at their own pace, be it slow or fast, and then the cassette is a permanent record with the students. Durbridge says:

‘It is understandable that more glamorous technologies such as video and computer attract a great deal of attention, but the humble audio cassette has a great deal to offer to distance education, and should not be ignored.’

Glamour and fancy may be justifiable in countries, which can afford expensive technology and bear enormous costs incurred in using it for educational purposes. But developing countries like India must not fall prey to glamour. They should try to use the available technology intelligently rather than introduce expensive new technology, the uses of which they are not sure when they do not have the trained manpower to use it.

2.6. LEARNING FROM AUDIO MEDIA

Among the various technologies now being used throughout the world, ranging from programmed instruction to computers, videotext and teleconferencing, the radio is the most economic medium. Developed countries — Australia, UK, etc., are engaged in producing and broadcasting radio programmes for the students at various levels of education — primary, secondary, university and teachers' training. Some of the developing countries, such as, India, Kenya, etc., broadcast educational programmes for the students of their countries. Some universities at various places in the world have their own low-powered campus radio stations, which provide educational radio programmes for the students enrolled with them.

Now a question arises — can the radio teach? We can authoritatively say 'yes'. As we have already discussed, the radio has the potential to influence people's knowledge, awareness and attitudes. This conclusion is based on the following features of the radio as a medium of instruction.

- i) The radio brings new resources to the students.
- ii) It takes the students out of the four walls of the classroom or the school.
- iii) It has tremendous power to reach remote areas.
- iv) It carries the burden of a teacher (distance teaching through radio), as it can disseminate information to one and all.
- v) It is very effective in teaching certain subjects. It has proved its potentiality in teaching Languages, History, Environmental Studies and Literature, for example.
- vi) It helps teachers and students achieve higher level objectives as it is quite effective for creative thinking and affective learning.
- vii) The radio is quite a flexible medium. It presents up-to-date information. Agriculture related messages, weather broadcast, market price, etc., can be broadcast instantly. Similarly, information on public service can be given to the people within a short time.
- viii) Another example of its flexibility is that the radio can effectively be used in conjunction with other media — particularly printed texts.

The effectiveness of the radio depends on how well it suits the requirements of the content being discussed or taught.

The radio, as a uni-sensory medium, provides only the voice and leaves the students to imagine about the appearance of objects, people, places and events depicted in the programmes. Thus, the radio stimulates the imagination of the students and contributes to achieving the educational goal of developing the students visual creativity (Thomas, 1987). This being the case, the producers and script-writers have important decisions to take with regard to what faculties ought to be stimulated, and how to prevent unwanted subject-matter.

All the subjects are not suitable for the audio medium. For example, when there is a need for showing certain objects, charts and diagrams as illustrations, it is not possible to do so unless the support material such as workbooks, etc., are provided. Searie and Sipper (1977) discussed some principles of good teaching, using the radio as an instructional medium. A list of these principles is as follows:

- Learning is more effective when the students are actively involved. Radio instruction should generate some action on the part of the students. Active responding may be oral, physical, or written.
- Learning will increase if the student is made aware of his/her progress on the programme. In other words, feedback will enhance the pace of learning. Therefore, the provision for feedback should be there in each programme.
- The content presented in a logical sequence — simple to complex, concrete to abstract — will ensure more learning from the radio.
- Practice with learning materials facilitates learning. The radio programmes should give the students opportunities to practise what they learn. Through practice they get an opportunity to review it. Meed (1977) also found in his study that the majority of the radio programmes require activities from the students other than that of listening.
- The students have individual differences and learn according to their pace.
- The students should know how to use radio programmes for optimum learning. They should know about the content being discussed and related activities well in advance. Here, programme notes can play an important role. Programme notes along with the students workbook should be made available to every student. Programme notes, besides a brief account of the content being discussed, include the title of the programme, objectives to be achieved, important learning tasks, pre-and post-listening activities. The pre-listening activities get the students psychologically ready to learn from the programme. These activities may also include necessary guidance/instructions to help the students learn smoothly. At the end of the programme, the post-listening activities help the students judge their performance/ progress. These activities (see Figure 1) also help the students to recapitulate and revise what they have studied in the programme. Thus, well thought out pre-and post-listening activities can ensure effective learning from the audio programmes.

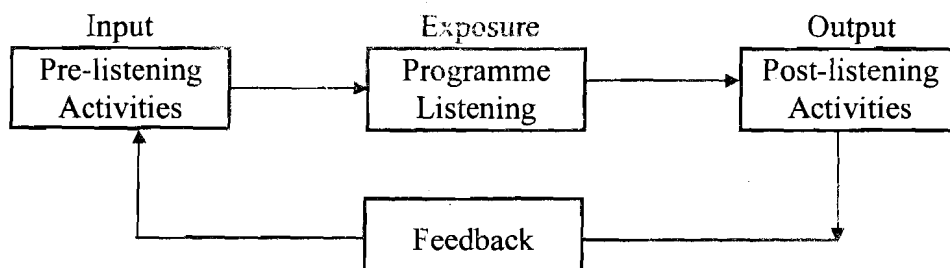


Figure 1: Pre- and post-listening activities

Although the radio is being used all over the world to achieve a variety of educational objectives, its use in education has been little researched. In India, we have not done any significant research on educational radio. You will not be able to find sufficient reference materials on educational radio, though the radio has a history of more than sixty years in India.

It has been proved through many studies that, given favourable conditions, students can learn from any media available to them. Media researchers' general conclusion was that the radio when supported by other media, can teach effectively. Jamison and McAnany (1978) reviewed research literature and concluded that the radio, properly used, can teach as well as or, in some cases, better than the traditional instruction. Considering the effectiveness, the costs and the access to technology, they further stated that the radio is a more suitable medium for the Third World countries, if they plan to use any electronic medium at all. The radio can be used to promote a variety of educational goals in different contexts.

Learning patterns

The radio is used for individual as well as group listening. We discuss both the patterns in some detail as follows.

- i) Individual listening:** The radio plays an important role in individualising instruction. There are various ways to use the radio for individuals learning. We touch upon three of them here.
 - a) The radio conveys the actual content to the students and they listen to programmes individually. Most AIR programmes (educational) fall in this category.
 - b) The radio is used to manage instructional process in conjunction with other media. For instance, the audiocassettes are used in conjunction with the print medium — textbooks, notes, workbooks, etc. After listening to a programme, each student works on the printed texts. This process helps individualization of learning.
 - c) The radio is used as a vehicle of interactive learning in which the individual student actively interacts with the content being transacted. S/he performs pedagogic activities as part of the learning process. The student works on in-built activities incorporated in the audiocassettes.
- ii) Group listening:** The radio can also play a useful role in group listening. As a group listening medium, it can be used at least in two ways:
 - The radio functions as a vehicle for supplying information for group consumption. News related to the weather conditions caters to a group to people in a region concerned.
 - The radio is used as a vehicle for guiding a group through common exercises/ activities. A group, a community as a whole, is addressed and directed for certain purposes/behaviours. The radio generates some group activities for people to work on. They interact and learn

certain modes of behaviour. Programmes on social education and general sanitation, etc. belong to this category.

In group listening, students do not use programmes in the same way that they do in individual listening. For instance, an individual listener uses relay/control facility more frequently than a listener in a group. Individual learners can skip or skim any part of the programme while doing so is problematic in group listening. Similarly, the individual listener is aware of the use of equipment, i.e., he or she knows how to start, stop and replay the equipment and search for the required contents. Such opportunities are not usually available to the listener in a group situation. Another important point is that the individual learner pays more attention to the discussion or transactions, while a group situation is itself a distracting factor for a listener in a group. But it does not mean that group listening is inferior to individual listening. Both have their own advantages. It depends on the nature of the content being discussed and the learning characteristics of individual students. In group listening, a student has his/her tutor and fellow students to discuss the content with. The student can raise a query, ask for certain clarifications and argue for or against the issue being discussed. The students feel more confident about their learning if it is followed by a discussion. This advantage is missing in an individual listening situation.

Check Your Progress 7

Notes : a) Space is given below for writing your answers.

b) Compare your answers with those given at the end of the Unit.

i) Write two functions of the pre-listening activities.

ii) Write three functions of the post-listening activities.

i)

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ii)

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2.7 FUTURE TRENDS IN EDUCATIONAL RADIO

With the advent of television, video and more sophisticated technological means of mass media, the future of the radio apparently looks bleak. The added advantages, sophisticated provisions, natural aspiration for the 'new' and the popularity in the urban areas, all of which the recently developed

media enjoy, make us wonder whether the radio can continue to serve as a means of education for long. However, we believe that the radio will still enjoy a long period of service to the cause of education at least in India and other developing countries. Our belief is based on the considerations of the economy and the vast rural masses in remote areas who are still far behind the advancements that we notice in the cities. To cater to the educational and entertainment needs of all these rural people, we cannot switch over to the modern gadgets overnight. Any attempt towards this might cost our exchequer exorbitantly. Hence, perforce we will have to continue with the cheaper and more feasible medium of knowledge dissemination — namely the radio for quite a considerable time to come.

Besides, however well established our telecast system and however wide-ranging our community TV programmes turn out to be in future, the radio cannot be totally replace at any stage. It will come in as a handy complementary device, wherever the other media prove disadvantageous in terms of cost-effectiveness, unfavourable operational conditions (like frequent power failures) and access to large section of the potential audience.

Again, if you consider the recent developments on audio broadcasting technology, for example the increase in FM radio stations and emergence of DAB makes the educational radio scenario qualitatively more enriching technically. At this stage the use of the acronym DAB must be making you wonder — what it is? In fact all radio broadcasting are analog transmission. “DAB is the acronym for a system of Digital Audio Broadcasting which has the advantage of being particularly convenient for covering transmission interference problems. DAB consists in combining a series of services into a frequency band called a base group. Unlike analog radio, in which each programme corresponds to a single frequency, the DAB system combines several programmes or services in one frequency division or ‘carrier’. This enables a multiplex bit stream to be created in which services of all shapes and sizes can be transmitted. A carrier bandwidth of approximately 15 MHz can contain up to five stereophonic programmes simulcast with additional data” (WCR, 1997: 139). The most important advantage of this technology is perfect sound quality free of any interference, capable of serving a mobile audience. Also the cost of transmitters can be 10 times less than those used by FM equipments. However, this technology is in the experimental stages in many countries though it has been proved quite useful.

2.8 LET US SUM UP

Inspite of advanced communication technologies with more glamour and efficiency, the radio is capable of generating the students’ own complete and thoroughly satisfying imaginative images (Jones, 1962). The content offered through the radio allows the students to build their own mental pictures, thus satisfying their needs. Merdian (1979) also finds that the radio is able to stimulate and make use of the students’ imagination to a far greater extent than the television. It implies that the main objective of the educational

radio programmes should be to stimulate thinking. For example, programmes like “discussions” and simple “dialogues” would function as thought-inducing agents. Programmes serve no purpose if they do not provoke thought. This observation identifies the important role of the educators and producers. While producing the radio programmes, due consideration should be given to include those ideas which ought to be stimulated, and those which should be left out.

We might agree that the radio always involves some form of scientific knowledge, whether it is a programme on History, a Natural Science broadcast, or whether the aim is to teach Music. Each programme has a piece of knowledge to convey. The second feature of the radio in this reference is that it caters, as far as educational programme are concerned, to clearly defined target groups: specific level of education, age, etc. It has implications for the educators and producers also, because they are supposed to have full knowledge of their students.

In conclusion, it may be said that the radio helps the students enhance skills of learning from listening. They learn how to develop meaningful and critical listening habits and get the maximum benefit out of it. By doing so, the radio develops the skills to assimilate information.

You may recall that beginning with the growth of educational radio in India in this unit, we have focused mainly on the following points in a discussion of the audio/radio medium.

- Due to its wide reach and pedagogical versatility the radio is a major means of delivering knowledge to the students, both under formal and non-formal systems of education. Various educational radio projects have been undertaken to exploit the potential of radio broadcasts. Some of the limitations/shortcomings of radio broadcasts can be overcome by use of audiotapes, radio-vision, audiovision and radiotext.
- The radio is used for both formal and developmental education. The main objectives of formal education are to enrich learning, help in direct teaching, extend in-school education and impart distance education as radio programmes are broadcast for the students of the primary, the secondary and the university level. For the last category, IGNOU is engaged in producing and using audiocassettes on a large scale.
- The radio is considered a powerful medium for developmental education — social, political, cultural and economic. The main objective of the development programmes is to sensitise people about their problems and motivate them to find adequate solutions.
- The radio is a comparatively cheaper medium. The cost of the radio programmes depends on the number of students to be catered to, and the life of a programme.
- The audio cassettes/tapes allow the students to control their learning pace. These make teaching-learning more interactive and participatory. This technology helps the students to acquire some desirable

- psychomotor skills also. In comparison to the other media, it is easier to combine audiocassette with any other medium.
- Media experts claim that the radio is as effective as other media. Learning from the radio is more effective if the programmes generate activity, feedback is provided and the content is presented logically. The teacher of tutors should organise pre- and post-listening activities accordingly.
 - The radio is used for individual as well as group listening.
 - In spite of innovations in communication technology, the radio may be the best bet for distance students. The emergence of DAB technology will play a vital role in the future of educational radio.

2.9 CHECK YOUR PROGRESS: THE KEY

- 1) Your answer may include any five of the following:
 - i) Early accessibility
 - ii) Video coverage
 - iii) Low cost production
 - iv) Easy learner reception
 - v) Effective thought promotion
 - vi) Stimulation of motivation.
- 2) Developmental communication refers to a participatory process intended to bring about desired changes in a society: social, cultural, political and economic. The three major objectives of radio developmental education are to inform, to motivate and to teach.
- 3) Audio cassettes have the following advantages over radio broadcasts:
 - Students can have control over their learning.
 - Students can play and replay cassettes until mastery over learning is achieved.
 - Students can learn the selected content: can skip, skim etc.
 - Integration of cassettes with other media is easy.
- 4)
 - i) Functions of pre-listening activities are:
 - to link the programmes with the previous knowledge of the students.
 - to set students psychologically ready for the next programme
 - to give an overview of what is to be discussed in the programme.
 - ii) Functions of the post-listening activities are:
 - to give feedback on the students' participation
 - to provide scope for discussion, and thus clarify doubts
 - to provide opportunities for peer group interaction.

UNIT 3 TELEVISION AND VIDEO COMPONENTS

Structure

- 3.0 Introduction
- 3.1 Objectives
- 3.2 Potential of Educational Television
 - 3.2.1 Strengths of television
 - 3.2.2 Limitations of television
- 3.3 The Indian Experience: A Historical Perspective
- 3.4 Some Recent Developments in Communication Technology
 - 3.4.1 Satellite based communication
 - 3.4.2 Videotapes
 - 3.4.3 Compressed video technology
- 3.5 Television Broadcasts
 - 3.5.1 Variety of television broadcasts
 - 3.5.2 Difficulties in using television broadcasts
 - 3.5.3 Status of television
- 3.6 Video Cassettes
 - 3.6.1 Videotapes: Types and standards
 - 3.6.2 Strengths and weaknesses of video cassettes
 - 3.6.3 Video programmes in IGNOU
- 3.7 Future Trends in Educational Television
- 3.8 Teletext and Videotext
 - 3.8.1 Teletext
 - 3.8.2 Advantages of teletext
 - 3.8.3 Teletext application in India
 - 3.8.4 Videotext
 - 3.8.5 Technology of videotext
 - 3.8.6 Applications of videotext
 - 3.8.7 Limitations of videotext
- 3.9 Optical Discs
 - 3.9.1 Characteristics of video disc
 - 3.9.2 Limitations of video disc
 - 3.9.3 Advantages of video disc
 - 3.9.4 Courseware development
- 3.10 Let Us Sum Up
- 3.11 Check Your Progress: The Key

3.0 INTRODUCTION

Among all the available electronic media, the radio and television, appear to be the most common and popular media for the distance students to learn from and for the distance educators to impart education at a distance.

In the previous unit you have studied the status, purposes and the role of the audio medium in teaching-learning at a distance. In this unit, you will go a step further and study the visual media in which the visual signals supported by audio components pass on the learning messages. By virtue of its audio and visual potentiality, the visual media have become a more popular means of instruction throughout the world.

With the advancement in communication technology, a variety of visual media — television broadcast, videocassettes, video disc, videotext and computer, have become part of the multi-media packages in teaching and learning at a distance. We shall discuss the video components and the corresponding various delivery systems in this unit.

We expect you to view some educational television programmes and discuss the delivery systems and the effectiveness of the programmes with those whom you find suitable for such a discussion. You should develop a few basic skills for effective learning from television and/or video programmes. This will help you understand the underlying potential of the visual media. In fact, the more you watch television, the more you learn about this medium.

3.1 OBJECTIVES

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

- explain the potential of educational television;
- enumerate the Indian experience in educational television projects;
- analyse the status of television in developing countries;
- list different types of television broadcast and video standards;
- describe the rationale for using the video cassettes in distance education;
- describe the future trends in the educational television;
- explain the role of the teletext, videotext and video disc in the distance teaching-learning process;
- compare the effectiveness of the television with other media; and
- describe the role of the video media in distance education.

3.2 POTENTIAL OF EDUCATIONAL TELEVISION

From a theoretical perspective, we can state that, in favourable conditions, students learn efficiently from educational television. While television can be a powerful educational tool, its value is totally dependent on the quality of material we transmit and the skill with which it is used.

The conclusions of research projects on educational television have shown that television is an effective tool in the hand of educators, if it is utilised

imaginatively. It has proved its effectiveness/supremacy in teaching certain subjects such as agriculture, science, geography, oceanography, etc. Let us discuss some of the major strengths of television.

3.2.1 Strengths of television

- i) Social equality in education:* Television promotes the goal of social equality in education catering to the masses of rural background and those living in slums of urban areas. Television increases the effectiveness of instruction and cuts down drop out rates.
- ii) Higher quality of instruction:* Television programmes are well planned/organised and better presented than the usual classroom instruction is.
- iii) Reduce dependency on teacher:* The students learn from television with their own efforts. They need minimum help from the teacher in case television is pressed into service.
- iv) Flexibility:* Rapid and continuing change in curricula and instructional methods are made possible through educational television. Courses can be constantly modified not only to update them but to incorporate the constantly changing needs of the society and the expansion of knowledge. This is not possible with some of the advanced electronic media like the videodisc.
- v) Use of the best available teacher:* Educational television makes educational opportunities equal throughout the country. The students in rural and deprived areas of the country, where educational resources are not available, get the same quality of education as their counterparts in the urban centres. The best teacher is equally available for every student. Thus television bridges the gap between the privileged and the under-privileged, and between the rural and the urban.
- vi) Cost effectiveness:* If television is utilised on a large scale, it proves cost effective. It can provide education throughout the country at a minimum cost without lowering the quality of instruction. The initial expenditure, of course, will be high.
- vii) In-service training:* Educational television can be used for in-service training of educators in non-school hours. NCERT, India is telecasting a programme every week for teachers to improve their teaching methods and skills.
- viii) Logistically simple:* In operating an effective distance education system, educational television is logistically very simple. The problems of planning and operating distance learning can be overcome to some extent by teaching through television.
- ix) Combination of audio and video components:* Television has the advantage of the audio as well as the video. That is why it has a greater appeal than the radio and the print media.

x) Stimulation: Through educational television, we can control the stimulation (the audio and the visual) to get response (learning).

xi) Mass education: Educational television can cater to the explosive increase in student numbers.

3.2.2 Limitations of television

As we have already mentioned, the potential of television depends on how effectively it is being utilised for educational purposes.

In spite of the numerous advantages listed above, television has its limitations as a medium of education. Some of the disadvantages are as follows:

i) Limitation of one-way-communication: Television is essentially a one-way-communication medium and as such it does not provide for interaction/discussion and hence does not provide for immediate feedback on learner's reactions, queries and doubts. It is a 'passive medium' as some educators would call it, since it turns learners into mere (passive) receivers of information. The absence of active participation and lack of provision for feedback are likely to fail to sustain the interest and enthusiasm of learners.

ii) Problem of pacing learning: Students differ in their learning speed and style. While watching a television programme, each student is required to be attentive and the teacher teaches at a speed which he assumes to be fairly suitable to an average learner. However, because of individual differences it can't cater to the speed of every learner.

iii) Poor accessibility: Television is still beyond the purchasing capacity of a common man. It therefore cannot become a medium of the masses.

iv) Insufficient viewing conditions: There are no adequate arrangements for viewing the programmes in colleges/schools.

v) High cost: Teaching through television is expensive. The high cost of sophisticated electronic gadgets demand huge amounts to be spent on the production/telecasting.

vi) Difficult to integrate: There are difficulties in building television as a part and parcel of on-going activities of a classroom/school. The difficulties are due to absence of uniform syllabus, absence of teachers with similar training and calibre, etc.

vii) Visuals becoming a distraction: Sometimes the visuals themselves create distraction and create interference in learning.

3.3 THE INDIAN EXPERIENCE: A HISTORICAL PERSPECTIVE

It is our intention to give you an overview of experiments in technology within the context of a developing country. We present some specific Indian cases below.

i) Secondary school television project (1961)

School television programmes were started in Delhi on experimental basis in October 1961 with three lessons per week in Physics and Chemistry and one lesson each in English and Hindi for Class XI. These programmes were syllabus-based and were telecast in school hours as a part and parcel of school activities. The aim of introducing television service in school system was to improve the standard of teaching in view of shortage of laboratories, space, equipment and dearth of qualified science teachers. The service was an experiment to find out what could possibly be accomplished to minimise the specific difficulties of higher secondary schools in Delhi specially in teaching science.

Commenting on the school television project, Paul Neurath (1968) stated that "by and large, the television schools did somewhat better in the test than did the non-television schools".

ii) Delhi Agriculture Television (DATV) Project: Krishi Darshan (1966)

Encouraged by the success of school telecast, an experimental TV programme, Krishi Darshan, was initiated on January 26, 1966 for communicating agricultural information to the farmers. Community viewing facilities were provided in 80 villages in the union territory of Delhi. The research on 'Krishi Darshan' reported that the experiment was successful and that there was substantial gain in the information regarding agricultural practices.

iii) Satellite Instructional Television Experiment (SITE) (1975)

SITE, one of the largest techno-social experiments ever conducted in human communication, was started on August 1, 1975 for a period of one year. It is a landmark in the use of sophisticated advanced technology for instructional purposes. The main objectives of this experiment, conducted in 2330 villages of six states, were to study the process of existing rural communication, the role of television as new medium of education, and the process of change brought about by the community television in the rural structure. SITE has shown that it was possible to reach with the new technology, a number of people in the remotest areas. Two types of programmes were telecast:

- i) Developmental educational programmes in the area of agriculture and allied subjects, health, family planning and social education were telecast in the evening for community viewing; and
- ii) The school programmes of 22 ½ minutes duration each in Hindi, Kannada, Oriya and Telugu were telecast on each school day for rural primary school children of 5-12 years age group.

The credo for school telecasts was "to make the children realise that science is everywhere, that their environment can be questioned, understood, explained and manipulated by them using scientific method" (Yashpal, 1977). The role of television was appreciated and it was accepted in rural primary schools as an educational force.

iv) Post-SITE project (1977)

A new SITE continuity project was initiated in March, 1977 when a terrestrial transmitter was commissioned at Jaipur. Developmental programmes were telecast by this project. The main objectives of SITE continuity project were to:

- i) familiarise the rural masses with the improved and scientific know how about farming, the use of fertilisers and the maintenance of health and hygiene;
- ii) bring about national and emotional integration; and
- iii) make rural children aware of the importance of education and healthy environment.

v) Indian National Satellite (INSAT) (1982)

Instructional television has further been strengthened through the use of satellite technology. INSAT-1A an indigenous multipurpose satellite, launched on April 10, 1982 was declared unusable on September 6, 1982. Later on INSAT-1B, launched on August 30, 1983 became fully operational on October 15, 1983. However, as a part of INSAT for Education project, ETV broadcasts were inaugurated and continued through terrestrial transmission from 15 August, 1982 in Orissa and Andhra Pradesh. Later, six states namely Andhra Pradesh, Bihar, Gujarat, Maharashtra, Orissa and U.P. were covered under INSAT service using INSAT-1B in June 1983. In each state, a cluster of 3-4 districts was selected on the basis of backwardness of the area, availability of suitable developmental infrastructure and utilisation of existing production facilities.

The prime objective of the INSAT service is to bring the rural and backward areas into the national mainstream, by quickening the development activities in these areas with mass media support. Therefore, the service is aimed at making the rural masses aware of the latest developments in the areas of agricultural productivity, health and hygiene.

Besides developmental programmes for community viewing, educational programmes (ETV) for two different age groups of school children (5-8 years and 9-11 years) are telecast daily. A capsule of 45 minutes duration consisting of two separate programmes — one for the lower age group and the other for the upper age group — is telecast regularly. Each programme runs for a duration of 20 minutes with five minutes change over time from one age group to the other. As of today, these ETV programmes are telecast in five languages — Oriya, Telugu, Marathi, Gujarati and Hindi — for a large population of primary school children. Programmes telecast in Hindi are being received in all Hindi speaking states in the northern belt.

vi) UGC — Higher Education Television Project (HETV) (1984)

The UGC-INSAT educational television project also known as 'country wide classroom' was inaugurated on August 15, 1984. The planning and production of the programmes are actively managed by the University Grants Commission (UGC). Under this programme, the one hour

programme in English in a variety of subjects are presented with the objective of general enrichment for undergraduates, educated public and the teachers as well. These programmes are aimed at improving the quality of higher education to create a dynamic classroom situation.

In order to give impetus to this scheme, an inter-university Consortium for Educational Communication (CEC) has been set up by the UGC and a chain of about 20 audio-visual media Mass Communication Research Centres have been set up at different institutions in the country. Besides producing programmes at these centres, some programmes are imported from other countries, and are edited to suit the requirements of the Indian students.

The "country-wide classroom" programmes aim to update, upgrade and enrich the quality of education while extending their reach. Designed to stimulate and not to satiate, the programmes seek to arouse the interests of viewers, whet their appetite and broaden their horizons.

Check Your Progress 1

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

b) Check your answer with the one given at the end of this unit.

Briefly comment on the common objective behind the projects listed above.

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3.4 SOME RECENT DEVELOPMENTS IN COMMUNICATION TECHNOLOGY

There are certain advanced electronic devices, which are being utilised by developed countries in their systems of teaching and learning. Though, many of these are not in frequent use in India you, as a student of distance education, should have some basic information about these gadgets. We present in the following sub-sections information about a few of these technologies.

3.4.1 Satellite-based communication

In India, the first educational experiment to exploit the potential of satellites in disseminating information was undertaken in 1975. The experiment, popularly known as SITE, established that the remotest rural masses can also be approached through satellite based television programme.

Thereafter, INSAT-1A and INSAT-1B have provided the means to strengthen distance education systems in India. More about satellite based communication shall be discussed in block 5, unit 2.

Some of the main advantages of satellite based communication systems can be summarised as follows.

i) Geographical coverage: In developing countries where geographical and other factors add to the difficulties in establishing a nationwide network, satellite communication has proved particularly useful and effective. It has the capacity to beam TV signals over a large distance and even in mountain areas where a terrestrial system cannot serve.

ii) Impetus for modernisation: The technology of satellite communication is very helpful in promoting faster social change/development in developing countries. By bringing the world to the villages through television, the communication system has opened the window for innovation and change and thereby quickened the process of modernisation.

iii) Immediacy in implementation: The satellite communication system being a centralised system requires a minimum amount of time for the planning and implementation of educational innovations. It can reduce the implementation time of any educational scheme.

iv) Cost effectiveness: Satellite technology provides a cost effective alternative educational system: the characteristic of the satellite to cover large masses spread over a vast distance makes it more cost effective than the terrestrial system. Since the cost of providing signals is not related to distance, remote communities can be served as cheaply as communities in more central locations without incurring extra costs for cables, station building, etc.

Check Your Progress 2

Notes: a) Write your answer in the space given below.

b) Check your answer with the one given at the end of this unit.

Attempt to list down the considerations that make satellites relevant to the Indian situation.

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3.4.2 Videotapes

Videotape is an effective and useful medium for distance education. The videotape technology, a comparatively new device in education, provides all

the advantages of television, while eliminating its crucial disadvantage of imposing a rigid time schedule on its users. The videotape, besides, may serve as an effective medium for illiterate learners who depend on spoken words and on visual images for communication.

Educational videotapes can be stored for future and can be used in a wide range of teaching-learning situations, as and when required. Videotape provides flexible learning situations as the student-user can exercise control over the presentation of the medium. Students can monitor the replay of the learning material with their individual pace of learning. That is, the videotape technology allows learners to stop, interrupt and discuss the material as often and for as long as they wish. More about this in section 3.6.

3.4.3 Compressed video technology

Most television broadcast are analog transmission. Video compression technology is a standard for digital transmission of the video signals. With the compression technique eight programmes could reside in the same space that previously transmitted only one programme. This has become a boon for satellite channels using less space for more programmes. The instrument that is used is called "codec" (short for compression / decompression). A codec converts analog signals from a video camera to digital signals. The algorithms used in the compression by the codec, are extremely sophisticated. In 1988 the International Telecommunication Union standardised this compression technology, which is known as "px64". This standard is currently being used by all codec manufacturers.

3.5 TELEVISION BROADCASTS

One of the main objectives of establishing a distance duration institution/university is to provide to the various population a wider access to higher education. To achieve this objective, the open universities have adopted a teaching-learning system based on a combination of print and non-print media. In this way, an open university aims to advance and disseminate knowledge by a variety of means, including the use of communication technologies, such as, films, the radio and television broadcasts, audio-video cassettes, teletext, computer, etc. However, in our situation we are not in a position to use all these media because of various constraints. We mainly use television broadcasts and videocassettes.

The television constitutes an important medium widely used to disseminate information to its viewers. More so, in the process of national development, television broadcasting has established itself as an important agent of social change. The television broadcast has clearly proved its superior effectiveness as a force of social transformation over other media. In the developed and developing countries, the television broadcast is becoming an important component of the distance teaching-learning systems. The majority of open universities throughout the world use it for the distance students. India is not an exception in this regard. Since its inception, the television has been perceived as an efficient force of education and

development in our country. Moreover, the television broadcast with its large audience, including the general public, is undoubtedly a better tool in the hands of the educators and media planners to bring the desired changes in society.

Encouraged by the success of the experimental TV service in the country, educational programmes are telecast for the primary, the secondary and the university level students. In India, for example, educational telecasts do form a segment of the Doordarshan (National Television Network) programmes both at the regional and the national levels.

3.5.1 Variety of television broadcasts

There can be a variety of educational television broadcast delivery systems. The three main varieties are as follows:

i) Live broadcast: Under this delivery system, educational events are directly telecast (live). You must have seen live telecasts of important international/national events, such as, Olympic and Asian Games, Cricket Test Matches, etc. This type of delivery system is possible when advanced broadcasting technology is available. The INSAT has, of course, added to the possibility of more live broadcasts in our country.

Live broadcast is not extensively used for education in India. It is, however, very useful for those educational programmes that do not have specific learning objectives but have educational value, either as a source of information on current events, or famous personalities talking to the students, etc.

Live broadcast can present much clearer visual images, which is not possible otherwise. Immediate transmission of the programmes to a theoretically unlimited audience is possible through the live broadcast.

The live broadcast, however, has its limitations too:

- All the students have to watch the same programme at the same time which is very difficult in our context, i.e., in imparting education through the distance mode in a country like ours where access to television and availability of time to all learners cannot be guaranteed.
- It is difficult to provide print support materials, which the students could use with the live broadcast.
- The inability on the part of the teacher to preview the live broadcast makes it difficult to arrange an appropriate discussion on the topic.

ii) Recorded broadcast: Under this system, pre-recorded programmes are telecast as per the transmission schedule. The existing educational television services in the country depend mainly on the already produced programmes. Such programmes are based on certain specific objectives to be achieved by the students.

Recording provides the facility to plan and produce programmes according to the convenience of the producers, and to broadcast during the timings that

are convenient to the students or the educational institutions, though it is the convenience of the broadcasting agency which takes the upper hand usually.

Such programmes can be well-planned and evaluated at each developmental stage. For example, formative evaluation can be carried out as the programmes are being developed. Thus recorded programmes could be of a better quality than live broadcasts because all facilities in terms of time, manpower equipment, etc. are exploited for producing these programmes.

iii) Closed circuit television broadcast (CCTV): Under this system, the pre-recorded and/or live programmes are transmitted on a closed circuit television. What is the closed circuit television? It is the link between the studio and a series of classrooms, usually by means of cables installed in an institution to transmit educational programmes. The system can link several classrooms or institutions, and allow transmission from any of the classroom studios.

In the developed countries, the production and the commercialization of educational and training programmes are common phenomena these days. Packages of such programmes are frequently available in the market, and they are for use in educational institution through closed circuit cables. The system is not used for educational purposes in India today, although it is used in India in commercial institutions, such as hotels and railway stations. This delivery system can be used in classroom teaching or in the cases of tutorials and some special activities at the study centres. However, it is complicated because it needs sophisticated equipment for recording and transmitting programmes. Every institution may not have the required resources to put the closed circuit television into use. Only when it is put to extensive use in educational situations shall we come to know its potential fully.

Check Your Progress 3

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of this unit.

List at least four advantages which recorded programmes have over live television broadcasts.

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3.5.2 Difficulties in using television broadcasts

A television broadcast has its own limitations and constraints. Some of the difficulties in making use of the TV broadcast for delivery of information are discussed as follows. You can list some more, based on your day-to-day experience, or exposure to various television programmes.

i) Inadequate coverage: In many countries including India, there is a problem of providing adequate television coverage throughout the country. In India, the television network covers 81.5 per cent of the total population in the country. However, a substantial number of students cannot receive the broadcast. Reaching the target group through broadcasting is a problem faced by the distance education institutions in many parts of the world. Secondly, many homes cannot afford television sets. Community television sets are limited, and the village/community politics is involved in using them. This is a reason why the majority of the community television sets are underutilised. Many field studies conducted on the utilisation of community viewing scheme confirm this conclusion.

ii) Complexity of viewers: In a broadcast, the same programme is viewed by different groups of viewers. Besides the target students (who also come from different socio-economic backgrounds), the general public also view these programmes. It implies that the programmes for both types of the viewers are a challenge for the academics as well as the programme producers. It is difficult to produce a programme, which is equally satisfying for both the students and the public.

iii) High transmission cost: High cost for making use of broadcast technology is yet another big hindrance for many open universities in the world. This is, however, not the case with India, because we do not have to pay for telecasting educational programmes either through the satellite or terrestrial transmitters, but some open universities such as Allama Iqbal Open University, Pakistan, Norwegian Institute of Distance Education, etc. are charged per hour transmission costs. A part of the budgets of these universities is spent on buying TV time.

iv) Insufficient time: Taking into account the large number of courses offered by the open universities, more transmission time is required. Broadcasting agencies may find it difficult to spare sufficient time for the open university programmes. Progressive increase in university programmes must increase pressure on TV, which will become more and more difficult to obtain with the passage of time.

Moreover, you might have noticed that, in comparison of the educational television programmes, priorities are given to the news and commercial programmes. The emphasis is given to generate as much revenue as possible, but educational programmes are not designed to generate revenue. So the broadcasting agencies do not favour them.

iv) Inappropriate telecast timings: It is very difficult to find the appropriate telecasting time for all the students in the regular transmission slots. By appropriate telecasting time we mean the time suited to a majority if not to

all the students. The open university students' complex profile and the non-availability of prime time for transmitting educational programmes hinders the effective use of the broadcast technologies for education. Moreover, it is very difficult to convince the media planners and administrators to allot prime time for the open university programmes. Many distance education institutions were found dissatisfied with the quality of transmission time available for the adult learners (Bates, 1984).

Activity 1

Undertake the following small survey on television broadcasts. Take an appropriate sample of ten respondents and ask them the following three questions:

- i) What is the most suitable time for you to view the educational programmes?
- ii) In which language would you prefer to view the educational television programmes.
- iii) What are the weakness of the television as an educational medium?

Analyse the responses, i.e., data and compare and discuss your findings with those of other students during a contact programme or measure them with the details and discussions presented in the unit.

Broadcasting is potentially the most effective way of the distribution of learning materials to the distance students in spite of some limitations, and the tremendous growth in the video cassette technology. The problem is one of the trust of the people in the broadcast television as a medium of learning. The public trust in broadcast as a learning experience is doubtful. The public and many of the teachers do not recognise the television as a learning medium. We should, therefore, make the educators, social workers, researchers, etc., aware of the educational advantages which television has over the print-based or face-to-face teaching.

3.5.3 Status of television

In Latin American Countries, for instance, there are hundreds of private commercial companies engaged in broadcasting. In many other countries there is just one single agency — either the government or the public service — which provides a broadcasting service to the entire country. There can be other kinds of broadcasting system — private broadcasting agencies run for financial gain, non-profit-making public service agencies, etc. In India, broadcasting is under the direct control of the government and the authority to broadcast radio or television programmes rest with the Ministry of Information and Broadcasting only. Now, there are winds of change blowing through the country to make the radio and the television autonomous institutions/agencies.

Table 1 gives the picture of status of television in the selected countries of the world. It indicates a wide range in access of television from 100 per cent in Japan to about 10 per cent in Bangladesh. In India only 31 per cent of the households have television sets.

With this background information let us now take a look at the status of the television broadcasting in India. Television in India today is one of the biggest networks in the world. Doordarshan expects to cover an estimated

90 per cent of the population in the country, on the completion of various ongoing projects under the 8th Five-Year Plan. At present, it covers 81.5 per cent of the population, which includes substantial population in rural areas (Indian Express, May 5, 1992), as against only 25 per cent in 1981 (Audience Research Unit, 1991). This rapid expansion was possible mainly because of the installation of low power transmitters (LPTs) starting from 1982. Today we have 529 transmitters functioning in India. It is this wide transmitting network which has made television accessible to such a large population in so short a time. This, in turn, motivated more people to have their own TV sets. Starting from 41 sets in 1962, the number of the TV sets reached approximately 2,78,200 in 1990 (Audience Research Unit, 1991). In 1994, 31 per cent of households had at least one television set. Besides easy accessibility of the relevant technology, varieties of programmes and increased duration of transmission network are also reasons for the rapid expansion of the TV systems in India.

To fulfill its main objectives — to inform, educate and entertain the country's multi-lingual and multi-ethnic population, its varied social, political and economic systems, particularly the rural/urban divide, the Doordarshan is telecasting programmes in seventeen Indian languages including English. This has become possible by using two types of services:

i) Regional service: To cater to the rural and the urban population residing in the effective range of each television centre, the regional language programmes are telecast in the evenings. These include informative and educative programmes addressed to the general as well as the specific audiences — children, youth, women, farmers, industrial workers, etc.

Additionally, the area specific programmes which inform the viewers about, and sensitize them to various developmental issues pertaining to the area are also telecast regionally, and to help students educational programmes are telecast in the respective regional languages.

ii) National service: A common national service provides telecasts daily from Delhi which are simultaneously relayed by all transmitters located in different parts of the country. Besides national and international events, including news bulletins, higher education programmes (HETV) also form part of this service. Currently Doordarshan has six channels. More than 85 per cent of the over 900 million population of the country now receives doordarshan programmes through a network of more than 700 terrestrial transmitters. At present satellite channels cover the Indian television scenario. Nearly 30 satellite channels are available to the people.

The television has both extended and changed the pattern of communication within society as a whole, and within various specific groups of individuals in particular. The recent advances in communication technologies have made the television programmes available to the teachers in classrooms and the distance students at their workplaces. With the reduction of the cost of the TV receivers, and increased television network in the country, a large chunk of population has easy access to the television viewing.

Table 1: Audiovisual indicators of selected countries, 1994

Country	Households (%)			
	TV	VCR	Satellite	Cable
Australia	99	83	N.a.	3
Bangladesh	10.6	4	N.a.	N.a.
Brazil	85	38	4	1.5
Canada	99	79	3	76
Chile	80	23	N.a.	10
China	73	53	N.a.	12
Columbia	97	21	14	3
Egypt	(94,00,000)	18	N.a.	0.2
France	94	68	N.a.	6
Germany	97	59	27	54
India	31	6	2.6	24
Japan	100	85.9	717	718
Kenya	14	65	0.3	0.6
Kuwait	(241000)	85.5	N.a.	N.a.
Mauritius	(150000)	60	N.a.	N.a.
Netherlands	98	68	5	95
Newzealand	98	75	N.a.	0.4
Pakistan	32	25	12	N.a.
Saudi Arab	(3021875)	78.1	N.a.	N.a.
Singapore	99	84	Banned	21
South Africa	59	32	0.5	18
Sri Lanka	53	6	0.5	N.a.
Switzerland	87	62	6	79
Thailand	90	23	0.1	1
Trinidad and Tobago	92	45	13	N.a.
United Arab Emirates	(375552)	88	N.a.	N.a.
United Kingdom	97	79	15	6
United States of America	99	79	2	63
Zimbabwe	(389000)	6	0.8	N.a.

N.a. = Data not available

Figures in numbers

Source: World Communication Report, 1997

The houses and community centres equipped with receivers are able to receive educational programmes without adding to costs or infrastructure.

The entrance of the television in the service of education has opened new horizons for the public in general, and the students in particular. A television serves the multiple purposes of entertainment, information and education. Besides performing motivational functions, the television facilitates discovery learning and cognitive development of the students, it has also proved its effectiveness in bringing the learning materials to the

students in a more direct and personal way than the printed texts can, and thus it is supposed to bring about a sense of belonging among the distance students scattered all over the country.

3.6 VIDEO CASSETTES

Though comparatively new and yet to become popular in the teaching-learning process, the video cassette is considered a more effective medium than the television broadcast. There are reasons for this. Video cassettes have certain advantages over the television. They are more flexible and convenient in their use because the students have full control over their pace of learning in terms of their time and place of using the video cassettes. Additionally, the replay facility has made it more suitable to individualised learning. Video programmes are equally useful for the distance as well as face-to-face classroom teaching. The main differences between the cassette and the television broadcast are given in Table 2.

Table 2: Video cassette and TV broadcast: A comparison

Video Cassette	TV Broadcast
Available as and when needed	Fixed viewing time
Repetition/search/mastery learning	Repetition, search, mastery learning not possible, cannot be reviewed
Individualised pace of learning	Fixed speed for all students
Integration with other media easy	Integration difficult
More flexible and decentralised systems of delivery	More rigid and centralised systems of delivery
Allows the students control over the learning process	Students have little control over the learning process
Distribution is difficult (through mail)	Distribution is easy (through transmission)

3.6.1 Videotape: Types and standards

The videotapes are normally of two kinds, viz. VHS and U-matic. The former is normally used for mass distribution, where as the later is the standard for master copy because of its superior quality. The videotapes come in three separate colour standards, which are PAL, SECAM and NTSC: These standards are incompatible to each other, and one videotape recorder can't run the tape of other standard.

PAL: This is the system employed in Britain. It stands for *Phase Alternate Line*.

NTSC: This is the US standard, which stands for *National Television Standards Committee*. In both PAL and NTSC, the three primary colours (red, green, blue) from which all the other colours are made are transmitted simultaneously.

SECAM: This is the French standard. It stands for *Sequential Couleur a Memoire*. As the name suggests, SECAM does not transmit the primary colours simultaneously, it transmits them in sequence.

3.6.2 Strengths and weaknesses of video cassettes

From Table 2 we can infer that the video cassette technology has its own advantages for the distance students as compared to television broadcasts. Now let us discuss, in brief, the practical advantages of the video cassettes, and also some of their weaknesses.

i) Minimum time: The video cassette provides planned learning and saves a lot of study time. This characteristic of the video cassette make the programmes more useful for educational purposes. The required knowledge can be imparted within a short time. Repeat facility also enables us to receive the desired knowledge/information as many times as we need it. Learning through the video cassette thus saves time, money and resources.

ii) Multiple mode communication: The video programmes can be presented in several modes. To hold the student's attention, and thus to motivate them, the content can be presented in interesting formats, which can help the students retain and recall information presented through the programmes. Also unlike the television, video cassettes can be viewed in various ways, which are independent of the fixed viewing timings.

iii) Standard content: The video cassettes are prepared by experts in the area. All the students receive the same quality content in the same style of delivery. This is not otherwise possible in face-to-face teaching in which only a few students get an opportunity to have high quality education as not all the teachers everywhere are equally effective.

iv) Flexibility: The cassette technology provides individualised learning. The students have control over the medium and hence over their pace of learning. A cassette can be stopped and replayed as many times and for as long as required.

v) Case study: A case study can be recorded on the location. Each step of the process of the case can be demonstrated through the video. Learning through case studies has proved quite effective for distance students and this can be done effectively with the help of cassettes.

Besides, the video cassette has all the educational advantages that the television broadcast has.

The video cassette has some weakness too, particularly in the Indian context. The use of the video cassette depends on the availability of the video cassette replay (VCR) equipment, and we cannot ensure each distance student access to the replay equipment in the near future. It is therefore, not advisable to exclusively depend upon the video cassette technology. The cost of a cassette replay equipment and lack of its availability in most student's homes are serious handicaps for its wide use. Table 1 indicates only 6 per cent of Indian household has VCR. To overcome this problem, the emphasis has been shifted from the home-based learning to the study centre-based learning. In other words, we have to depend on the group use of video programmes. The video cassette recorders are made available at the study centres for viewing. You may argue here that it is not simple to provide easy access to the study centres in a big country like India. The use

of the video cassettes through the study centre network has, therefore, its own limitations. Experience shows that only about one-third of the students enrolled make use of the facilities at the study centres.

3.6.3 Video programmes in Indira Gandhi National Open University (IGNOU)

Taking into account the potential and the weaknesses of video cassettes in teaching-learning at a distance, IGNOU makes use of the video cassette and the broadcast technology to supplement the printed texts, and these programmes have become an important component of the IGNOU course materials.

Video cassettes are expected to play an increasing role in IGNOU's support to its students. Cassettes are made available to the students through the network of more than 350 study centres/work centres (the number is likely to be increased) all over the country. The audio and video cassette recorders are available at the study centres to those students who want to make use of the programmes. The students can go to the study centre according to their convenience. Of course, they have to make arrangement with the co-ordinator of the centre to listen or view the audio-video programmes.

It is expected that video cassettes are viewed in groups at the study centres, and so, the cassettes are usually designed for group viewing. At the end of each programme, there is a general discussion among students and with the academic-counsellor on the content presented. Group viewing helps the students draw more than what they may do individually from the video cassettes. Moreover, they get support and guidance from both the peer group and the academic-counsellor, as they learn as much from the peer group as from the programme itself.

Some video programmes are produced for individual use also. The content of such video programmes is broken into several components with suitable activities/exercises. Such video programmes allow the student full control over his/her learning. Thus with the help of the video cassette we can overcome some of the weaknesses of the television broadcast. Efforts are being made to design programmes allowing enhanced control to students such as,

- clear stopping points,
- use of learning activities, and
- close integration with the text.

The video cassette is a recent development in instructional technology which aims to overcome some of the limitations of television broadcast. The television is generally criticised for not having any scope for involving the students in learning activities since it does not provide for learners 'control' over the medium. But, then, where the students do not have access to video cassettes, television is the only way to reach them, notwithstanding the limitations of the broadcast. Accordingly, as per IGNOU plans the television and video cassettes will supplement each other. The combination

will remove various limitations of both the television broadcast and the video cassette.

To make the video cassettes more popular and easily available to both the students and the general public, IGNOU has now made arrangements for the mass production and sale of its cassettes through external selling agencies.

It is pertinent to mention here that we in India do not have much research evidence on how our students use the video cassettes at the study centres. Perhaps, some of you could work on this theme. The answers to the questions a) whether the students and academic-counsellors use the video cassettes in such a way as to get the best from the video cassettes; b) to what extent do the students interact with the video programmes, etc. can be explored through specially mounted studies.

3.7 FUTURE TRENDS IN EDUCATIONAL TELEVISION

Since its introduction in the education sector, the question as to whether or not the television facilitates the students' thinking or has been discussed widely. The issue is still being debated. However, we have enough research evidence that the TV stimulates students' learning, i.e., enhances their attention, learning, assimilation and application of knowledge gained.

The problem is one of relating television to education, because the TV is mainly being used by the public as a medium of entertainment. We want it to play the role of a teacher. But the students who are used to learning through the print media from the beginning may not be comfortable with the television as a teaching machine. So it is necessary to convince the students and teachers (including distance educators) about the use of the TV and help to get the maximum out of it. We have to orient the students to learn from the television. For this the TV and the video programmes have to be attractive, visually rich, interactive in nature and need-based.

A few experiments on educational television have been undertaken by various experts — either as individuals or as representatives of institutions. Based on the empirical evidence available in India and in those countries which have successfully utilized the television in the service of education, we can plan and identify effective strategies to make the optimum use of this medium, but nothing significant has come up so far.

To ensure proper utilization of the television in the service of education in future, we have to look into some of its pitfalls also. Let us discuss a few of them.

i) Research: This is the most neglected area. We have not yet succeeded in directing our thinking and in mobilising our resources to establish a scientific link between research and effective utilization of the potentials of this medium in our situation. It is a major responsibility for all of us involved in planning, producing and utilizing the television for educational purposes to undertake intensive formative and summative research studies.

This could help us to identify better strategies for teaching/learning through the television. Educational institutions should recognise the need for long term research activities. We need to develop research models to suit our own conditions, and not to depend on research studies conducted in the western countries where the situations, both educational and technological, are very different from ours.

Besides, research will help us to produce programmes, which are suited to the requirement of the target students. The programmes will be able to reflect our social reality and meet actual educational needs.

ii) Training: Training the personnel to understand the role of the television and to use it for educational purposes has not been given a serious thought in our country. Human resource development and training are important components in designing and utilising the television for educational purposes. The majority of the personnel involved in educational television lack adequate skills. All those who are involved in distance teaching need intensive training — both pre-service and on-the-job, in theory and in practice, related to the television-mediated education. If we want to use the television on a large scale, we must have more professionals to manage the televised instruction at various levels of education. This can be achieved only if adequate infrastructure for training is created to meet the increasing demands for skilled human power.

iii) Software: The production of software is a big challenge for the educators all over the world. The software here refers to the television programmes. We in India need cost effective and quality software which demands imaginative planning, dedication and team-spirit among the agencies and the personnel (professionals) involved in the job.

If you study the development of communication technology in the world in general, and in India in particular, you will find that all along more emphasis has been placed on hardware. Technology is changing at an extremely fast pace and we have not been able to give due attention to developing software at the same pace. It is high time that we divert our resources to develop appropriate software banks.

iv) Two-way systems: Distance education is at the threshold of a new era. We are gradually moving away from the single print medium to new, exciting non-print media, which should ensure active participation of the students. Two-way interactive systems are becoming increasingly popular. It is expected that interactive systems would dominate the distance learning mode in the near future. Some mechanism, therefore, is to be developed to make the television a means of effective two-way communication in conditions like ours. While suggesting this, we are fully aware that the interactive systems cost more, and the delivery systems become complex and difficult to manage. And we are also aware that due to lack of adequate technological infrastructure available in the country, we cannot go in for a large scale use of the systems. But we should not forget that two-way didactic interaction shall lead to better learning by the students. We,

therefore, need to make a beginning however humble it might be, in this direction.

v) **The current scenario:** The explosion of Information Technology and the availability and wide use of electronic media have now become a phenomenon common to the entire world. However in the context of the developing countries, the emphasis should be on harnessing these resources for socio-political stability and economic advancement. The immense power of the electronic media 'to reach out' and 'to educate' should be kept in mind.

Check Your Process 4

Notes : a) Write your answers in the space given below.

b) Compare your answers with the one given at the end of this unit.

- i) What are the strength of the video cassette? List any *four*.
- ii) Keeping in view the current scenario and future ends in educational television list *three* important areas which need urgent and sustained attention from academics and electronic media specialists.

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3.8 TELETEXT AND VIDEOTEXT

One of the main objectives of an open learning institution is make education more accessible to a large section of society. The provision of teletext and videotext facilities at domestic, community and study centres can make distance education more accessible and lively. The students can have immediate access to information to be provided by the institution.

3.8.1 Teletext

The inclusion of teletext as a medium of instruction may surprise you because it is not being used for educational purposes in our country. But teletext is one of the advanced communication technologies with a tremendous potential for education at a distance. Teletext is the generic term for transmission of pages of information as digitised signals through the televised medium. It makes the common television receiver function like a computer terminal for retrieval of textual information and graphics from a remote database. Please remember teletext is not television. It however uses the hardware of the television but presents only text messages and graphics to its clientele. With the help of a suitable device, the user can select any

information of the text being transmitted, and can see on the TV screen in place of normal television programmes. In short, teletext is one of the new telecommunication media for widespread dissemination of textual and graphic information through an electronic device to display on suitably equipped television receivers under the control of the user.

The principles of teletext are simple. A number of pages of text or graphics are stored in a distance database, just like the pages of a textbook. Each page is numbered and indexed to indicate the information that it contains. The texts are digitised and are inserted into the unused portions of the analog television signal. The digitised text messages or pages of information are continuously broadcast in a cycle. A viewer can see all the messages in a cycle, or using a control pad, typically a remote control unit, switch back and forth between the teletext service and the normal programming on a given channel. Even, the user can select specific pages of information using the control pad. Suppose a viewer is looking at page 6 and then presses 25 on the control pad, it will not appear until it comes in the broadcast cycle. Similarly if the viewer is in page 26 and presses 25, the viewer has to wait until the next cycle.

3.8.2 Advantages of teletext

We said that teletext is a computerised textual transmission service. It has many advantages for distance teaching.

- It uses the television already available at homes or community centres. Thus it provides much wider access to information.
- Changing and updating the teletext script is easy, as easy as typing a letter. Data can be changed within no time.
- Concise and effective content of the teletext makes the learning more appealing and less burdensome.
- Information about courses, careers, job opportunities, etc. can be transmitted easily with the help of this technology.
- It is useful for transmitting information about agricultural farm management, libraries, industries, etc. It can make these agencies more efficient and cost effective.

3.8.3 Teletext application in India

The teletext service in India was formally inaugurated by the Doordarshan Delhi on November 14, 1985. It is known as 'INTEXT' (meaning Indian teletext). Teletext uses the medium of television for transmitting information. The data are organised into pages, which contain text and graphic symbols. Six colours can be used in creating these graphics. The information is pooled and transmitted on a few predetermined lines in vertical 'blanking' interval of television signals. The information is in the form of magazines, each of which contains about 100 pages. The details of contents of the magazine are given on the first page.

News items, sports events, financial trends, timings of arrival and departure of important trains, weather forecast, city engagements, AIR and TV programmes to be telecast, etc. are given through teletext service. The information is collected through four hotlines connecting teletext information-room to:

- i) the meteorological department,
- ii) the northern railway central enquiry,
- iii) the Indian Airlines enquiry (for domestic departure), and
- iv) the Air Traffic Control (for international arrivals).

Thus using the existing television broadcast, additional information can be transmitted in the form of teletext service.

Efforts are being made to provide the teletext service on a large scale. In addition, it can also create pages with characters from different Indian languages. No effort has so far been made to use teletext service for educational purposes. In advanced countries also the educational application of teletext has been largely on an experimental basis so far.

Check Your Progress 5

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of this unit.

On the basis of what you have studied in this section, list three disadvantages/ limitations of teletext.

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3.8.4 Videotext

Videotext is a two-way interactive communication, wherein students and other users can transmit the requests to a central database; a large master computer fulfils the needs of the users simultaneously. On the other hand, teletext is a one way system with signals flowing from a source to a user who can read the desired information on a television signals.

Both the cost and the scope of videotext are far greater than teletext. Teletext usually emphasises the information with broadcast appeals (e.g., weather, sports, news headlines) while videotext offers more specialised information (e.g., educational features, financial data, classified advertisements).

Videotext allows the students to put questions to or ask for information from database or a sources in order to obtain specific information, whereas with teletext a single set of electronic text is sent simultaneously to all users, and

by using a special fixture attached to the receiver a student can select the needed pages of the text from the continuous cycling pages of data appearing on the screen.

Videotext is also referred to as 'videotex' and the terms are used interchangeably. Therefore, one should not get confused over their usage.

3.8.5 Technology of videotext

Videotext is a system for providing an interactive information retrieval service. This particular technological development is one further step in the 'information revolution' which many industrialised countries are now experiencing.

Videotext allows the home television to function like a computer terminal that retrieves text information and graphics from a remote database. Thus, these technologies bring in 'power into home at a reasonable cost' (Antoni, 1982).

The basic videotext system consists of a keypad or keyboard, a TV display unit, a decoder, a telecommunication link (modem) and a central computer containing a database. Videotext uses television and telephone in order to provide access to the computerised information. The keypad, a small frame with number-buttons on it, is used to request pages of required information from a remote computer.

The television is connected to the computer by telephone and it is adapted by means of a decoder to display the recordings on a videotext when it is played. Thus the home television set is turned into a terminal (see Figure 1). As a television set is already present in most of the homes, of developed countries, this device promises a wide range of social and educational utility.

The decoder can be wired directly into the television set during the manufacturing process or can be fitted on externally at a later stage. The decoder allows a TV set to display text and graphics from digital signals transmitted down the telephone line and to transmit back the information entered through a keypad. A modem (modulator-demodulator) enables the computer and the decoder to communicate in digital form over telephone lines designed for the speech.

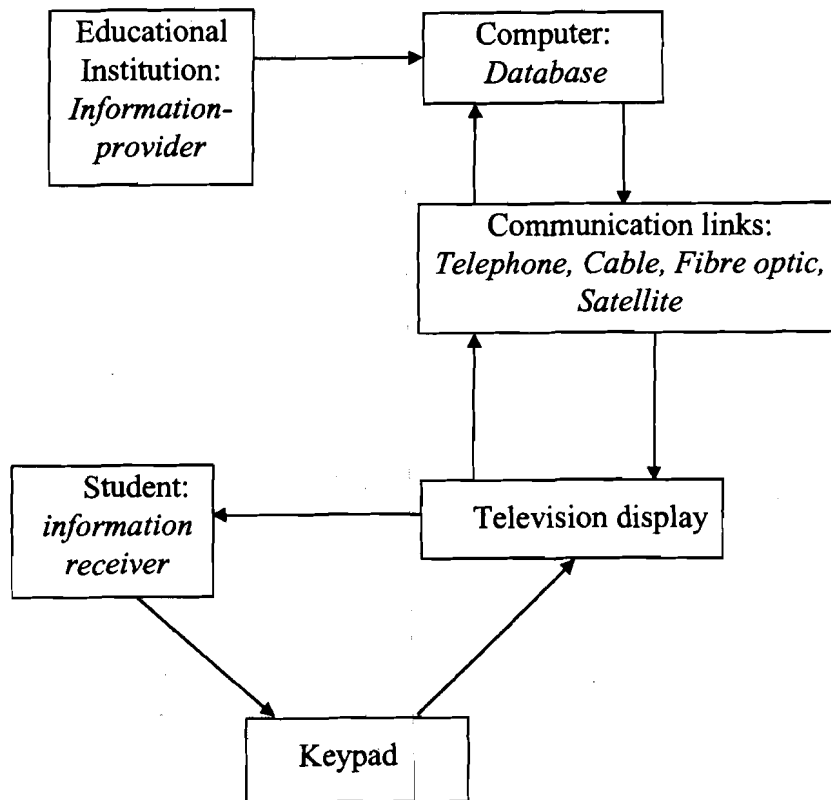


Figure 1: Diagrammatic view of a Videotext System

3.8.6 Applications of videotext

Most videotext applications are currently at their initial phases. A number of applications for videotext have been tested such as word games, teaching a second language, instruction to deaf, etc. In distance education videotext can be used for the transmission and two-way interaction on general or specific information.

A videotext system is very useful in disseminating general information about courses and programmes available, in raising the level of awareness of potential learners about educational opportunities available.

The system with a substantial database can be very helpful to learners in remote areas as they could have access to the kind and the volume of information currently available to learners in areas with large libraries.

Videotext offers advantage over other time-bound communication media like radio, television or telephone because it is free from a time schedule. If a keyboard could be added to the user terminal, a videotext can offer computer-assisted instruction also. Two-way interaction between the teacher and the taught is also possible with alphanumeric keyboard (i.e. a keyboard with number-buttons). It is definitely faster than the post and has an advantage over telephone because this kind of interaction does not have to wait for a mutually convenient time for discussion. In the long run it may also prove to be quite cost-effective.

3.8.7 Limitation of videotext

However, while the videotext system provides graphic capabilities, there is no provision for including audio. So videotext would work better if it is used as a part of multi-media system in providing instructional material. As it is still at an experimental stage, its cost-effectiveness can not be determined.

Thus videotext systems provide means for delivering instructional material to those individuals who have chosen to learn at a distance. However, there are at present few instructional programmes, which are being delivered by this method. To date, most educational applications of videotext and teletext systems have as their information base a catalogue listing the courses available or the services provided by the institution.

Some developed countries such as UK, France, Japan, Canada and USA use videotext for various purposes. Some universities in the UK and Canada utilize videotext to help their students who receive a wider variety of materials for study and research. The success of this technology in the developing countries is still very much in doubt. Unless the necessary infrastructure is created at both the institution's and the students' ends, the use of videotext and teletext will remain limited.

Check You Progress 6

Notes : a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of this unit.

Distinguish videotext from teletext by listing at least four characteristics of the former.

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3.9 OPTICAL DISCS

The delivery of video or visual information has changed dramatically over the years since the development of high density storage media. With the emergence of optical laser disc technology, the typical videotape may be redundant and obsolete in the coming years. The optical discs, besides providing high storage capacity can also be used as an interactive media, with which the learner can interact and learn. It has also the capacity of being a full multimedia technology having text, sound, pictures and full motion video. The optical discs are basically of two categories, viz. The Compact Disc Read Only Memory (CD-ROM), the Digital Video Disc

(DVD). Currently the CD-ROMs are in common to deliver educational materials. A CD-ROM can store 680 MB of data which is equivalent to approximately 475 high density floppy diskettes. In other words it can store 275,000 A4 size pages of text or about 70 minutes of audio or about 23 minutes of video. Whereas, DVD can store about 300 minutes of video, which is equivalent to about 8 GB of information. Typically a DVD can store between 3.95 GB of information on each side, and as it supports two sided media (in contrast to CD which support one side only) a total of 7.9 GB can be stored in a single DVD (Parsons, 1998). The enormous storage capacity of CD-ROM and DVD makes them more popular. A typical CD-ROM/DVD is 12 cm in diameter and 1.2 mm thick with a 15 mm hole in the centre. The CD-ROMs physical composition comprises a polycarbonate substrate (to give the disc its rigidity), a very thin layer of reflective aluminium (to store the data), and a lacquer protective coating (to prevent damage to the reflective data surface). A DVD can be said to be two CD-ROMs joined together by an adhesive layer. However, they differ in terms of their storage capacity. Now let us discuss in details the educational applications of video discs, which will subsume in it the application of CD-ROMs.

3.9.1 Characteristics of video disc

Here are some of the major characteristics of the video disc technology, and their educational implications.

i) Automatic frame stop: The disc can freeze a single frame that begins a formal instructional sequence to which the student may be asked to respond. This capacity is made possible by a tiny micro-processor unit within the video disc player.

ii) Frame number: Because each frame (picture) has its own electronic number, the students can search specific information without any loss of time. Since the audio-video information stored on the video disc is read by an optical device, individual frames can be singled out and presented for any length of time as desired. A microcomputer can be added to it to make the video disc system more effective and purposeful so that it offers individualised and interactive instruction to the students. If the student responds to a question improperly, the computer not only processes the answer but goes automatically to a pre-assigned frame which begins another corrective instructional sequence.

iii) Dual audio tracks: The video disc can have two different language tracks. This capacity allows a student to listen to any one or two languages for any given pictorial sequence or in an elementary or advanced version of his native tongue. This characteristic should be very useful for a multilingual country like India.

iv) Adjustable forward and reverse timing: The students can follow any sequence in slow motion so that they may comprehend it better and learn at their own pace. The video disc can be stopped to pose questions, moved backward to repeat display of information, or stepped forward to a desired

bit of the information. The students have the option to fast forward, to skim part of the material they do not want to view just as they do while reading the printed material.

v) **Still frame:** The video disc can focus on still frames, enabling the students to give more attention to detailed information. Also, with still frames, more time can be given for commentary and complicated learning activities, including diagrams, tables, graphs, etc.

vi) **Chapter stop:** The fast forward and reverse functions can be used to go to pre-designated locations, which can be thought of as chapters. This will encourage the students to use glossaries, items in dictionaries and reference materials.

vii) **Interaction:** The video disc coupled with the microcomputer allows students to interact with the material at their own pace and at their own choice. The major educational advantage of this technology is in terms of student control. This characteristic has made it more suited to education and training.

3.9.2 Limitations of video disc

There are some problems in using the video disc in distance education. The weaknesses of the video disc technology appear to be few but they are very significant.

- i) Probably the greatest problem is the non-availability of the courseware. Without adequate courseware the video disc is of little use in education.
- ii) It requires highly sophisticated equipment. The cost of equipment and courseware is very high, which the Indian students cannot afford. Because of the non-availability of courseware in the market, and also the high cost, the video disc has limited practical utility.
- iii) Lastly, unlike the video cassette, it is not possible to re-record programmes on a pre-recorded video disc. Therefore, video disc is best suited to the recording and storing of programmes of more or less permanent nature on subjects like History, Language and Literature. More precisely, it can't be used for information that change very fast.

3.9.3 Advantages of video disc

Use of video is inexpensive, when the discs are mass-produced. Besides, the discs require little storage room. These two factors make it possible to gather extensive library of courses on small discs. The discs also provide easy accessibility and retrieval of the material of our choice. The random access feature permits rapid frame search. The video disc can be used to increase learner productivity through:

- more information in attractive presentation modes,
- immediate access (forward and reverse) to different parts of the disc,

- facility for repetition to achieve mastery.

3.9.4 Courseware development

The recording and reading of programmes in a video disc are done by employing the laser beam technique. High power recording LASER beam modulated by the video signals writes on the disc in patterns of grooves, called land and pits. The disc looks like a gleaming silver disc with grooves on it. Because of the necessity for good courseware, several production agencies in the developed countries are engaged in the development of the video disc programmes. The video disc production agencies feel that, on account of the expenses involved in the production of the video disc programmes, duplication of efforts should be avoided.

The suggested method for the video disc formatting is called **pre-mastering**. This involves four stages. The first stage is assembling of information to be put on the disc. The second stage is the evaluation of the material using special electronic equipment, which simulates the video disc player performance prior to disc mastering and duplication. A sample target audience evaluates the effectiveness of the material against its instructional design objectives. The third stage is where revisions are made and the final one is that of coding instructions for transfer to the video disc. The master video disc is then produced and duplicated for mass distribution. Because of the high cost of making the master disc, the cost effectiveness of the video disc depends on the market size.

Check Your Progress 7

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

How does use of video disc enhance learning?

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3.10 LET US SUM UP

Discussing the potential of television in this unit, we pointed out how it can help the much desired concept of democratisation of educational opportunities, while at the same time, offering quality education through the best available teachers. We also referred to its pedagogical soundness, resulting from the complementary use of the two channels of 'sight' and 'sound' for its communication. Television has its limitations too. It is essentially a one-way communication and consequently, offers no provision

for interaction and immediate feedback. Besides, learners cannot exercise any control over the presentation to suit their conveniences of time and ability. Sometimes the means may turn out to be a source of distraction from the desired end. Some good visuals or a fine piece of music may preoccupy the learner's mind and this blocks their way to the desired end.

Several inventions have been made to add on to the potential of the television by attempting to eliminate some of its weaknesses. Chief among them are the invention of the videotape and the use of satellites for telecasts.

The growth of the television in India has been given as a reference points to pitch the discussion within the context of the developing countries. The establishment of a national open university and of the prospective state open universities has given a new thrust to the use of satellites and educational television.

The television is an important high quality medium for distance education. The effectiveness of the television depends on the situation in which it is used and the degree of success in exploiting fully its unique teaching characteristics. More so, its effectiveness depends, to a large extent on how the content and relevant visuals are structured and presented. Above all, the availability of technology based on which the distance students decides, whether or not to use a particular medium.

We have also discussed the television broadcast and its three types — live broadcast, recorded broadcast and closed circuit broadcast. Difficulties in making use of the broadcast viz. inadequate coverage, diversity among the viewers, high transmission cost and inadequate timings, too have been discussed.

The challenges before educational television in the developing countries are: lack of research studies; inadequately trained personnel involved in planning, scripting, producing and evaluating television programmes; and the limited availability of software. There has only been a small beginning in using media for educational purposes in our situation.

We also discussed the teletext, videotext and video disc technology and their educational applications.

3.11 CHECK YOUR PROGRESS: THE KEY

- 1) The common purpose behind the various television projects can be formulated as: the use of television for the social, economical and intellectual growth of the country and for an attempt towards the standardisation of education in the country.
- 2) The following considerations make satellites specially relevant to the Indian situation:
 - i) It can cater to a large geographic area.
 - ii) It is very helpful in promoting faster social development/modernisation.
 - iii) It can, being a centralised system, reduce the planning and implementation time of educational schemes.

- iv) It provides a cost-effective alternative educational system.
- 3) i) Recorded programmes are produced and can be broadcast as per the convenience of the producers and the students respectively.
- ii) Recorded programmes are based on specific objectives.
- iii) Proper editing and addition of music and sound effects are possible in recorded programmes.
- iv) Formative evaluation can easily be carried out in recorded programmes.
- 4) i) Strengths of video cassettes:
 - Available as and when needed.
 - Repetition, search, stop-start techniques are possible as required.
 - Integration with other media is easy.
 - Allows learner's control over the learning process.
- ii) Areas which need urgent and continuous attention of academics and ET/media specialists are:
 - Research
 - Training
 - Software Development
 - Utilization
- 5) i) Limited application for educational purposes.
- ii) No explanations possible — it is a one-way communication system.
- iii) Poor access — students cannot use the system.
- iv) Only visual presentation, no background commentary possible in this system.
- v) Non-availability of courseware that could be used on a large scale.
- 6) i) Videotext is a two-way communication system.
- ii) Videotext is costlier.
- iii) Videotext has wider scope; it can offer more specialised information.
- iv) The student can get feedback through videotext.
- 7) The use of video disc can enhance learning through:
 - i) giving more information in an appealing format,
 - ii) making different parts (content) of the disc easily available (by means of forward and reverse techniques),
 - iii) providing facility for repetition to achieve mastery,
 - iv) providing higher motivation/reinforcement,
 - v) giving immediate feedback, and
 - vi) providing frequent interaction with contents.

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