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;
Media in Distance Education

- 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>
<thead>
<tr>
<th>Sensory Channels</th>
<th>Major Illustrative Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Teacher’s voice, language laboratory, audio tapes, radio broadcasts etc;</td>
</tr>
<tr>
<td>Visual</td>
<td>Pictures, charts, models, handouts, film slides, transparencies, programmed instructional material etc;</td>
</tr>
<tr>
<td>Audio-Visual</td>
<td>Open channel television, closed circuit television, videotape, etc;</td>
</tr>
<tr>
<td>Tactile</td>
<td>Working models, simulated devices, adaptive teaching machines etc</td>
</tr>
</tbody>
</table>

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

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

**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.
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 somewhat 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-à-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 necessitates 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 widespread 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>
<thead>
<tr>
<th>Individual learners</th>
<th>Medium size groups at one place</th>
<th>Scattered individual or groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone</td>
<td>Films</td>
<td>CCTV</td>
</tr>
<tr>
<td>Computer-assisted instruction (on sharing basis)</td>
<td>Videotapes</td>
<td>open broadcast television</td>
</tr>
<tr>
<td></td>
<td>Film strips</td>
<td>Radio</td>
</tr>
<tr>
<td></td>
<td>Slides</td>
<td>Fascimile</td>
</tr>
<tr>
<td></td>
<td>Audiotapes</td>
<td>Slow-scan television</td>
</tr>
<tr>
<td></td>
<td>Charts, posters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-D models</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slow-scan television</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>MEDIA</th>
<th>CRITERIA</th>
<th>Portability</th>
<th>Individualized use</th>
<th>Control over use</th>
<th>Control over functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Television</td>
<td>Yes (portable models only)</td>
<td>Yes</td>
<td>Yes</td>
<td>No. TV Schedule</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>pre-determined</td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Film</td>
<td>Yes (for portable models</td>
<td>Yes (though costly)</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photographs</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Slides</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Audio Tape</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Video Tape</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Yes (only for Notebooks)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Videodisc</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Still Pictures</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Motion Pictures</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Television</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>3-D Objects</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Audio-Recordings</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Programmed Instruction</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Demonstration</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Printed Textbooks</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Oral Presentation</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

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 chose 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.

<table>
<thead>
<tr>
<th>Check Your Progress 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Notes:</strong> a) <em>Space is provided below for your answers.</em> b) <em>Compare your answers with those given at the end of this unit.</em></td>
</tr>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.2.4 Application and use of media</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
<tr>
<td><strong>Combined use of media</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>
| 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.

<table>
<thead>
<tr>
<th>Text</th>
<th>&quot;Now let's hear the heart's rhythm after the drug has been absorbed: Switch on your tape again and listen to Section G......&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Tape</td>
<td>&quot; ......................................................................................................................... &quot;</td>
</tr>
<tr>
<td>Text</td>
<td>&quot;Activity 10 — what has happened to the heart’s rhythm? Write down the two most obvious changes&quot;.</td>
</tr>
</tbody>
</table>

**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 approach 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:**

* Space is given below for your answers.
* Compare your answers with those given at the end of this unit.

Briefly describe complementary and supplementary patterns or media mix.

---

**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.
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.
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 values 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

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

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

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.

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### 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-mediated 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, interpersonal, 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

<table>
<thead>
<tr>
<th>Media</th>
<th>Large</th>
<th>Small</th>
<th>Presentation</th>
<th>Skills</th>
<th>Learning Material</th>
<th>Social</th>
<th>Organisational Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-way Media</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Print</td>
<td>Good</td>
<td>Good</td>
<td>Average</td>
<td>Average</td>
<td>Average</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Radio</td>
<td>Good</td>
<td>Good</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>Average</td>
</tr>
<tr>
<td>Audio Cassette</td>
<td>Good</td>
<td>Good</td>
<td>Average</td>
<td>Average</td>
<td>Good</td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Educational Broadcast TV</td>
<td>Average</td>
<td>Poor</td>
<td>Poor</td>
<td>Good</td>
<td>Poor</td>
<td>Poor</td>
<td>Average</td>
</tr>
<tr>
<td>Pre-recorded TV</td>
<td>Poor</td>
<td>Good</td>
<td>Poor</td>
<td>Average</td>
<td>Average</td>
<td>Average</td>
<td>Poor</td>
</tr>
<tr>
<td>Video cassettes</td>
<td>Good</td>
<td>Average</td>
<td>Poor</td>
<td>Good</td>
<td>Good</td>
<td>Poor</td>
<td>Average</td>
</tr>
<tr>
<td>Computer based learning</td>
<td>Average</td>
<td>Poor</td>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Multimedia</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>Good</td>
<td>Good</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Two-way Media</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio Conferencing</td>
<td>Good</td>
<td>Poor</td>
<td>Good</td>
<td>Poor</td>
<td>Average</td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td>Live Interactive TV</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
</tr>
<tr>
<td>Video Conferencing</td>
<td>Poor</td>
<td>Average</td>
<td>Poor</td>
<td>Average</td>
<td>Average</td>
<td>Average</td>
<td>Good</td>
</tr>
<tr>
<td>CMC</td>
<td>Average</td>
<td>Average</td>
<td>Good</td>
<td>Poor</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
</tr>
</tbody>
</table>

(Source: Bates, 1995)

Activity

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

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 kilohertz. 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.

Hawkridge (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 purposes.
- 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.

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.
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 considerations 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

1. 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.

2. 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:

<table>
<thead>
<tr>
<th>Sensory channel</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Audio</td>
<td>Radio, audiotape.</td>
</tr>
<tr>
<td>b) Visual</td>
<td>Silent film, film slide.</td>
</tr>
<tr>
<td>c) Audio- visual</td>
<td>Television, video tapes.</td>
</tr>
<tr>
<td>d) Tactile or kinesthetic</td>
<td>Working models, experiment kits etc.</td>
</tr>
</tbody>
</table>

3. 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.

4. 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.