# TOPIC 4

# Media Characteristics



## 1. Overview

These materials support a discussion on the topic of the various media used in open and distance learning.

### *1.1 Source materials for this topic*

Bates, T. *Technology, open learning, and distance education*. London: Routledge, 1995.

Collis, B. *Tele-learning in a digital world: the future of distance learning.* London: International Thomson Computer Press, 1996.

International Extension College. *Electronic media in distance education.* Course 6, M.A. in Distance Education. Cambridge: IEC, 1995.

Khan, B. (ed.) *Web-based instruction.* Englewood Cliffs, N.J.: Educational Technology Publications, 1997.

Mason, R. *Using communications media in open and flexible learning.* London: Kogan Page, 1994.

## 2. Media characteristics

The media that are available for use in open and distance learning can be described in terms of a number of characteristics. Among the more important characteristics are:

- accessibility;
- costs;
- teaching functions; and
- interactivity.

### *2.1 Accessibility*

The first questions to ask in any open and distance learning programme are:

- Who is the target group?
- Will there be open access to the course?

In particular, it is important to ask where the learner is expected to learn. There are several possibilities:

- at home;
- at work;
- at a local public education centre; or
- at a regional learning centre.

To some extent, access will depend on what technology is already available for other purposes. For example:

- if every learner already has their own computer for work purposes, it might also be used for the open and distance learning course; or
- if the teaching is to be home-based, then the limited technology available in most homes must be taken into account.

Open access, home-based learning will be limited in many countries to relatively few technologies:

- print and radio in the poorest countries;
- print, radio, audio cassettes, and possibly television in more wealthy countries; and

- print, video cassettes, telephone, and computer in the wealthiest countries.

Some technologies may be relatively common but unavailable to all members of the target group. Even in the wealthiest countries there are always a small number of people who do not have television, or access to a telephone.

It may be a mistake to make some media or technologies 'optional', in the sense that learners can pass examinations or do assignments without using a particular technology, just because some potential learners will not have access to the technology. Experience suggests that course designers will avoid using these media for essential material, and learners will stop using the technology as well.

> *Example*: For an example of an institution that makes media use compulsory, see the case study for the Open Access College in Australia.

### *2.2 Costs*

It is important to distinguish among

- capital and recurrent or operating expenditure;
- central (or production) and local (or delivery) capital costs; and
- fixed costs and variable costs.

Costs can be distinguished using the following examples.

- The cost of putting equipment into local centres or workstations can far exceed central capital costs in organisations with multiple study centres.
- The major cost of using technologies for teaching is in production and hence recurrent rather than capital; in general, the recurrent costs of producing good quality technology-based materials tend to be underestimated.
- Since production is the main cost, and hence is fixed for any course, for most technologies currently used in national distance teaching and open learning institutions, fixed costs usually far exceed variable costs; consequently the economies of scale apply to 'traditional' open and distance learning courses: the more learners, the more cost-effective technologies become.
- Some of the newer interactive technologies such as computer conferencing and audiographics reduce fixed costs but have high variable costs, thereby making them suitable for courses with relatively small learner numbers.

These cost issues are covered in more detail in Topic 8 (Managing Media Integration).

### *2.3 Teaching functions*

It is much easier to discriminate between media on the basis of access or cost than it is on the basis of teaching effectiveness.

Media are flexible in that each medium can be used in a wide variety of ways. Differences within a medium may be greater than between media; for example, the differences between two television programmes may be greater than the differences between a face-to-face lecture and a lecture on a radio programme.

Nevertheless, intrinsic differences between media are being identified that have implications for teaching and learning. Specifically, media differ

- in the extent to which they can represent different kinds of knowledge, for example, concrete or abstract; and
- in the extent to which they can help develop different skills, due to the control characteristics of the medium and its representational features.

Course and instructional designers need to identify clearly

- the content of a course;
- how best to present knowledge in a particular subject area; and
- what kinds of learning — comprehension, analysis, application, problem-solving — are required.

### *2.4 Interactivity*

Interactivity — the ability for the learner to respond in some way to the teaching material and obtain comment or feedback on the response — considerably increases learning effectiveness. There are two kinds of interactivity:

- *social interactivity*: learners' interaction with teachers and with each other via the medium; and
- *learning material interactivity*: learners' interaction with the medium; the level and the immediacy of feedback the medium itself provides; the extent to which the medium will accommodate the learners' own input and direction.

Media such as print and broadcasting that provide one-way interaction, need to be supplemented by media that provide with two-way interaction with tutors, that is, social interactivity, via the following media:

- telephone;
- correspondence;
- computer communication; or
- face-to-face tutorials.

An important feature of this two-way interaction is the extent to which it is under the learner's control, allowing learners to interact easily with tutors and other learners.

The following table categorises different media used in open and distance learning according to whether they offer one-way or two-way interaction.

Media Categorised as One-way or Two-way Interaction

| | **Audio** | **Radio** | **Video** | **Television** | **Computers** |
|---|---|---|---|---|---|
| **One-way** | Cassettes<br>Audiovision | Educational radio<br>Interactive radio instruction | Cassettes<br>Discs<br>Clubs | Educational television | Games<br>Computer-assisted learning<br>Databases<br>Bulletin boards<br>Web-based instruction |
| **Two-way** | Telephone tutoring<br>Audio conference<br>Audio-graphics | Two-way instructional radio | Interactive video | Video conference<br>Interactive television | Computer conference<br>Computer-mediated communication |

## 3. Descriptions of open and distance learning media

### *3.1 Print*

Print continues to be the most widely used medium in open and distance learning. Even in organisations that use telecommunications technologies to transmit the bulk of information and learning materials to the learner, some 'hard copy' or print materials are required.

**Advantages of Print Media**

| **Accessibility** | **Costs** | **Teaching functions** | **Interactivity** |
|---|---|---|---|
| a familiar technology<br>easy to use<br>portable<br>learner-controlled pace | relatively low-cost to buy<br>relatively low-cost to produce | can provide carefully argued analyses and systematic presentation<br>provides learners with a record of their learning experience<br>graphics, photographs, diagrams, and | can be used as a medium of exchange between tutor and learner, assuming efficient postal or other delivery service<br>can be designed in an interactive manner that involves the learner in his or her |

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|---|---|---|---|
| | | diagrams, and sketches are useful learning aids<br>can be used for group discussion | learning |

**Limitations of Print Media**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| requires learner to be able to read and write<br>disadvantages learners who are not part of a 'reading culture' | storage, handling, and distribution costs can be high | needs to be integrated with other media to make it truly interactive and responsive to learner input | essentially a one-way medium |

### *3.2 Face-to-face*

Face-to-face tuition continues to be the most common way of enablin g distance learners to communicate with tutors and with other learners in an immediately interactive manner. Open and distance learning organisations often tend to provide decentralised, face-to-face contact with learners by means of a network of access centres, tutorial centres, regional offices, or centres of all three types, to which learners come to obtain information about courses, enrol in courses, collect their course materials, attend tutorial and counselling sessions, and write their examinations.

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**Advantages of Face-to-Face Contact**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| the most familiar mode of teaching and learning<br>the 'study circle' helps those with low levels of literacy work with print materials | requires no special materials or equipment | personalises the learning materials<br>greater impact for changing attitudes<br>academic abstractions can be brought to life<br>teacher can help learner work through difficult concepts | the most fully interactive of all the modes of teaching and learning<br>directly responsive to learners' needs and problems<br>learner–learner interactions valuable for motivation and understanding |

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| | | can model good practice<br>can incorporate other media<br>facilitates practical work such as laboratories | |

**Limitations of Face-to-Face Contact**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| learners must travel to a learning centre or other site<br>difficult to provide for remote or dispersed learner populations<br>physical or other handicaps can deter learners from participating | requires facilities owned, rented, or shared with other institutions<br>tutors and facilitators must be trained in facilitation<br>learner-to-tutor ratio needs to be kept low if sessions are to be truly interactive | needs to be integrated with other media and teaching aids to maintain learner interest and to present the sights, sound, and 'spirit' of subject<br>learners need instruction and support in effective communication and note-taking | relies on effective facilitation of communication<br>not automatically a two-way medium |

### *3.3 Audio*

#### Audio cassettes

In every country of the world, you can see people, young and old, listening to audio cassettes, probably enjoying music recorded on them. As a means of conveying culture, audio cassettes have become extremely important. Used in this way, they are certainly a form of open and distance learning.

**Advantages of Audio Cassettes**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| a familiar technology<br>easy to use<br>portable<br>learner-controlled pace<br>literacy not required | relatively low-cost to buy<br>relatively low-cost to produce<br>short lead time to produce | hearing words helps vocabulary and pronunciation<br>emphasis and meaning are added by modulation of human voice<br>personalises teaching<br>greater impact for changing attitudes<br>academic abstractions can be brought to life<br>lessons can be of variable duration<br>can be used for group discussion<br>teacher can 'talk' learner through difficult concepts<br>can model good practice<br>allows use of drama and documentaries | can be used as a medium of exchange between tutor and learner |

**Limitations of Audio Cassettes**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| power source needed for operation | batteries can be relatively costly | needs to be integrated with other media, especially print, for visual component<br>professional readers may be needed for full realisation of | essentially a one-way medium |

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| | | advantages of human voice | |

### Audiovision

The power and scope of audio can be greatly enhanced as audiovision, where it is closely linked with visual materials. Audiovision is a composite medium. That is, the visual materials are not subordinate to the audio, but are rather essential source material that the audio cassette interprets for the learner. The visual material is the content, and the audio cassette talks learners through that content.

**Advantages of Audiovision**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| learner-controlled<br>portable<br>easy to use | less costly than video for combination of sound and visuals for situations in which motion is not needed | particularly effective in talking learners step-by-step through a process<br>inclusion of visuals widens teacher's scope | prompts activity on the part of the learner |

**Limitations of Audiovision**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| need for print materials limits portability | extended production time required | lack of motion may be a limitation | essentially a one-way medium |

### Telephone tutoring and audio conferencing

Telephone tutoring is normally between a tutor and an individual learner, usually at home, with no special equipment required other than that provided by telephone company exchanges. Audio conferencing links teachers, groups, or both via a two-way speech channel, over telephone lines or sometimes by radio, usually in study centres but also in homes.

**Advantages of Audio Conferencing**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| familiar technology<br>readily available to most learners in industrialised countries | costs typically lower than travel costs over long distances<br>considerable savings in time | dialogue can be established<br>tutor can diagnose learners' problems and offer help<br>isolated learners can get in touch with other learners or tutor<br>tutor can guide learners, question their values, suggest alternative views, and help them assimilate knowledge<br>audio conferencing accomplishes learner–learner discussion | a fully interactive medium |

**Limitations of Audio Conferencing**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| in many countries the quality of telephone lines is poor and access is limited<br>over half the world's people have never made a telephone call<br>audio conferences can require travel to learning site, which may be difficult<br>even in industrialised countries audio | in many countries the ownership and rental of a telephone and long distance charges limit usage to elite<br>audio conference requires purchase of expensive equipment and its maintenance | lack of visuals can be very limiting<br>staff and learners need training in how to use telephone communication effectively for learning<br>teachers tend to lecture over the system, which can be deadly<br>audio conference sessions need to be | problems with the telephone line and equipment breakdowns can limit interactivity<br>'real-time' interaction, requiring learners and tutors to co-ordinate their schedules |

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| quality can be problematic | | carefully planned and facilitated | |

### Audiographics

Audiographic learning occurs when learners and instructors use telephone and graphics technologies to facilitate dialogue, exchange messages, and access experts as part of a learning process. Graphics technologies or devices are pieces of equipment that create, store, and send visual materials such as handwriting, drawings, and still pictures over normal telephone lines. Audio conferences become audiographic conferences with the incorporation of this equipment, which allows everyone in the conference to handwrite or type text and draw graphics that are seen in all locations in the conference.

**Advantages of Audiographic Media**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| • generally the same as for audio conferences | • costs to user still tend to be lower than cost of travel over long distances | • addition of graphics expands teacher's repertoire considerably<br>• subjects such as mathematics can be taught successfully over the telephone | • a fully interactive medium |

**Limitations of Audiographic Media**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| less flexible, since learners must attend conference sites in order to use equipment | higher cost than audio conference alone | teachers and learners need training and practice on equipment to use it effectively<br>greater complexity of equipment can mean greater likelihood of breakdowns, limiting utility | real-time interactivity, requiring co-ordination of schedules |

### *3.4 Radio*

Radio is the most accessible of all the media for open and distance learning. In even the poorest countries, most people can be reached through radio, at relatively low cost. Radio broadcasts words, music, and other sounds, and in the case of digital radio can also be used to transmit data in the form of text and graphics.

**Educational radio**

What counts as educational radio? It includes

- the broadcasting of programmes that aim to teach directly and indirectly; and
- the use of these programmes in both formal and non-formal learning, whether in classrooms, factories, community centres, or at home.

There are many different combinations of purpose on the part of broadcasters and use on the part of learners.

Direct teaching by radio is also known as instructional radio. It is formal instruction if it relates closely to the school or university curriculum.

Indirect teaching is often called enrichment, and can be formal or non-formal. A radio campaign is an example of direct, non-formal teaching.

> *Example*: For examples of institutions that use radio extensively, see the case studies for the Open Access College and the Indira Gandhi National Open University.

*Discussion*: Ask participants what types of educational radio are used in their countries and contexts, and for which audiences. If some types of radio broadcast are not used, why not? Do audiences exist for which they could be valuable?

**Advantages of Educational Radio**

| **Accessibility** | **Costs** | **Teaching functions** | **Interactivity** |
|---|---|---|---|
| probably the most accessible electronic medium<br>in almost every country of the world, most households have a radio<br>literacy is not a requirement | receivers tend to be relatively low cost<br>the 'Baygen' wind-up radio needs no batteries | can be used to motivate learners, increasing their interest in specific topics<br>gives learners an organisational framework for structuring information, which can improve their | radio can be used in interactive contexts |

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| | | assimilation, storage, and retrieval of this information<br>transmits to learners some immediate learning goals or objectives related to course content<br>more generally shows learners how to use this information in different situations<br>can be very effective combined with print and study groups | |

**Limitations of Educational Radio**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| broadcast times tend to be inconvenient<br>reception can be poor<br>access to household radio by women, for example, can be limited | power supply for radio, for example, batteries, can be costly | learner has no control over pace and time of broadcast<br>lack of visuals can be problematic if broadcasts are not combined with print | broadcast radio is essentially a one-way medium |

### Two-way instructional radio

Can radio provide a two-way communication system for teaching and learning? In theory, yes; but in practice, seldom.

> *Example*: The School of the Air, serving children in remote parts of Australia's outback, has used two-way shortwave radio so that teachers can have conversations with individual children, as if they were on the telephone. The Open Access College in Australia continues to use radio, in the form of high frequency radio links.

Other countries with two-way shortwave radio networks have probably done the same, but on a very small scale involving at most hundreds of learners, not thousands.

There are also hybrid systems that involve radio and telephone.

> *Example*: A 'narrowcasting' tutorial system using sub-carrier FM radio and telephone feedback was trial tested in the 1980s in Australia. The tutor, who was based at Murdoch University in Western Australia, broadcast from a studio using a radio signal that rode 'piggy-back' on a normal signal. Only learners with a decoder could pick up the sub-carrier signal. They could talk back to the tutor by telephone.

Radio is also used for direct teaching in schools. Interactive radio instruction is the best-known example. It is a one-way communication system, and is only interactive in the sense that the radio teacher stimulates the children to respond actively.

> *Example*: Interactive radio instruction was first implemented on a large scale in Nicaragua, in the Radio Mathematics Project. Mathematics may not seem the most obvious subject to teach directly by radio, but evaluators deemed the project a success. It ended because of a change of government, but the concepts have been exploited in several other countries, for teaching English and science as well as mathematics, in countries including Kenya, the Dominican Republic, and South Africa, to name only a few.

## *3.5 Video*

### Video cassettes

Video cassettes can carry either complete television programmes or short segments of specially prepared instruction. The teacher and learner can stop the tape and re-play it.

Video is supplementing or even replacing broadcast television in open and distance learning. Some institutions that use video have never bothered about broadcasting. For example, this is true of the German Fernuniversitat, the Dutch Open universiteit, and the Spanish UNED. In the United Kingdom, the National Extension College once used television but now relies on video.

**Advantages of Video Cassettes**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| in industrialised countries, the majority of households own or have access to video cassette players<br>not bound by broadcast schedules | costs of playback equipment have dropped considerably in recent years<br>video cassettes are relatively inexpensive | learners have control over pause, rewind, fast forward, and replay<br>video provides learners with vicarious experience for experiments, field trips, and techniques<br>imparts visually or conceptually dense information<br>triggers reflection or group discussion<br>segmentation into short, unrelated sequences makes video more an audio-visual resource and less a coherent presentation, which is useful in some learning contexts | learner can be prompted to interact actively with video material rather than sit as passive viewer |

**Limitations of Video Cassettes**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| access to video playback equipment in developing countries is likely limited to learning centres | costs of playback equipment prohibitive for individuals and households<br>unlike broadcast television, costs of video cassette distribution rises with the number of learners | locating a particular segment on a video cassette can be problematic<br>learners may need training in using the technology effectively | video cassettes are essentially a one-way medium |

### Video discs

Video discs contain digitally recorded video and sound. They look rather like an old 78-rpm gramophone record, but are iridescent and silvery instead of black. One disc contains about 54,000 frames, which can be used in several ways: as an hour of video with sound; as several thousand pages of text; or as a mixture of text, still pictures, and video. Video discs offer some extra advantages to teachers and learners because access to any part of the disc is precise and takes only a few seconds. Like video cassettes, video discs can store moving pictures and two sound tracks. They can also store still pictures better than can video cassettes, though stills have no sound, as with video cassettes. But video discs require a separate player, and not many people or institutions have such a machine. For this reason, and because of the high cost of making the master discs, video discs have not entered open and distance learning in large numbers.

### Video clubs

Video cassette recorders or players are essential for using video cassettes. In industrialised countries, people on lower incomes own them as often as those who are richer. Video cassette rental outlets (which used to be 'clubs' requiring membership) enable individuals to rent videos of many kinds, mostly films for entertainment. Similarly, libraries carry stocks of videos that schools and individuals can borrow.

In developing countries, video clubs operate in many locations. They usually show movies and charge a fee for admission. Some of the videos available through such sources can be counted as offering education of a kind, even enrichment. There are no reports yet of video clubs being drawn into open and distance learning. They seem likely to continue to provide cultural enrichment, on the spot rather than at a distance.

> *Discussion*: Ask participants if video clubs are part of open and distance learning in their countries and contexts or likely to become so.

### Interactive video

Interactive video includes video cassettes and video discs controlled by a special player or a computer. The emphasis is on interaction of the learner with the video images and sound, to increase the learner's active learning. It is one-way communication, however; the learner does not interact with the video teacher.

Not many examples exist of use of interactive video in open and distance learning. The United Kingdom Open University wanted to introduce interactive video into certain science courses, and, with help from the British Broadcasting Corporation, made a few interactive video discs at considerable expense. Learners study these at residential school, however, because they do not have the players at home. For example, an interactive disc developed for a course in Materials Science takes about three hours to work through. Similarly, the Dutch Open universiteit provides teaching through interactive video at study centres only.

### *3.6 Television*

**Educational television**

Television came into favour for educational purposes from about 1950 onward. Although the mode of transmission has become much more varied, with conventional broadcasting from terrestrial transmitters now supplemented by cable television and broadcasting via satellite, the purposes remain the same:

- to enrich lessons through documentary-type programmes; or
- to teach content directly.

**Advantages of Educational Television**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| in more affluent countries, almost all households have television; it is a familiar medium | although costly, the entertainment value of television prompts households and individuals to purchase sets<br>broadcast transmission is a cheap and effective mode of distribution | television serves an explanatory role, particularly useful in areas in which sound and moving pictures and models are needed to further understanding<br>television provides evidence; showing documentary real world material takes learners into real world<br>useful for pacing work for the learner, because of the need to keep up with the broadcast schedule<br>can be used to keep learners in touch with events within the institution | well-designed broadcasts can involve the learner in active ways |

**Limitations of Educational Television**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| broadcasts tend to | in less affluent | broadcast | broadcast television |

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| be at times that are inconvenient to learners | countries, the cost of television sets restricts their use to the elite<br>high quality programming is costly to produce | programmes offer little or no opportunity for learners to determine the depth to which they attend to and study different sections of the material<br>the presentation style must be appropriate to a single viewing<br>broadcasts specify a particular programme length that may be inappropriate to the learning task | is essentially a one-way medium |

**Video conferencing**

In video conferencing, participants are linked by two-way vision as well as two-way audio. Television screens at the front of the classroom display pictures from distant locations, and video cameras show people in the distant locations what is happening in the classroom. The links are essentially telephone connections. These links are more costly than those for audio conferencing, because far more data must be transferred, either by broadband ISDN cable or through television transmitters and receivers, sometimes via satellite. Costs are dropping, however, especially due to improved techniques for compressing the data thereby reducing transmission costs.

**Advantages of Video Conferencing**

| **Accessibility** | **Costs** | **Teaching functions** | **Interactivity** |
|---|---|---|---|
| in industrialised countries, video conference suites are available in most cities and many institutions<br>desktop video conferencing equipment makes it possible for learners | costs of equipment, although still prohibitive for most individual learners, are dropping to the point of becoming affordable for institutions and organisations<br>producing sessions | most closely approximates a face-to-face lecture or training session – as in the 'virtual' classroom<br>creates social presence and comfortable environment for | video conferenc-ing is the most interactive medium available |

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| to participate without leaving their homes or offices<br>Multi-site small group conferences make expertise via the virtual classroom available to remote sites | for video conferencing is less costly than production for broadcast television<br>reduces costs of travel and time<br>collaboration via consortia offers cost sharing opportunities | learning<br>lecture format is appropriate for state-of-the-art subject levels; for example, postgraduate courses or professional updating<br>various formats, involving less lecturing and more demonstrating or pre-prepared video presentations, enable to show what could not be seen live<br>document cameras enable the use of text and pre-prepared graphics<br>studio-produced video conferences present discussions among experts, for example, with voice overs and visual footage | |

**Limitations of Video Conferencing**

| **Accessibility** | **Costs** | **Teaching functions** | **Interactivity** |
|---|---|---|---|
| demands 'real-time' interaction; learners must attend video sites at particular times<br>even at home, time schedule ties learners to particular times and places | cost of equipment and usage charges for higher bandwidth communications links are major drawbacks at present<br>more preparation time is required of teachers to plan sessions and make | demands much higher energy levels than face-to-face lecturing because of the need to concentrate simultaneously on content, visual material, and learners at remote sites<br>learners find medium | lack of interactivity in many applications, because of unfamiliarity with equipment or less than full exploitation of capabilities<br>if video transmission disappears, the session can carry on, but if audio link |

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| | visual material | more intense as well; with slight blurring or incomplete synchronisation. | breaks down, the session must end |

### *3.7 Computers*

#### Computer-assisted learning

In computer-assisted learning, computers

- work interactively with individuals, patiently providing instant feedback;
- tutorials simulate a dialogue between learner and tutor, with the computer as tutor;
- the computer provides information and tests the learner;
- the computer more or less controls the route the learner takes;
- simulations model or represent a variety of situations, from the abstract (for example, economics) to the concrete (for example, an airplane cockpit).

> *Example*: Few open and distance learning institutions use computer-assisted learning, even at the tertiary level. The Dutch Open University is the open and distance learning provider that appears to have committed perhaps the most energy to exploiting this medium, starting off with microcomputers for computer-assisted learning in its local study centres and now making packages available for home use.

Teaching computer-based skills via computers shares many of the same features as computer-assisted learning, but is not the same.

> *Examples*: Distant learners at many institutions in the United Kingdom (for example, the National Extension College and the Open University) learn word-processing, database, and spreadsheet skills using computers at home.
>
> Engineering learners of the Open University of Sri Lanka are expected to use computers for 60 hours a year during weekends in regional study centres to learn computer-aided design. Learners are pushed to try computer-aided design by requiring them to submit all three assignments and obtain a pass on them in order to be allowed to sit the final examination in the course.

### Computer-mediated communication

Computer-mediated communication usually includes computer conferencing, electronic mail, and access to databases and electronic bulletin boards or newsgroups. In computer-mediated communication:

- all utterances are stored, retrievable, and editable;
- participants can contribute at their own pace and convenient times; and
- time is allowed for reflection and careful composition of contributions.

**Advantages of Computer-Mediated Communication**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| in industrialised countries, household and personal ownership of computers and subscription to Internet service providers is growing exponentially<br><br>in less affluent countries institutions can make computers and Internet links available at learning centres | the costs of equipment and connectivity are dropping, at least in industrialised countries<br><br>programmes using computer-mediated communication as a main delivery medium can be mounted quickly | the textual nature of the interaction develops written communication skills, enhances in-depth processing, and recall of course material<br><br>computer-mediated communication is particularly suited to collaborative discussions and peer activities; for example, brainstorming, seminars, small group work, and peer learning<br><br>fosters active learning, with learners engaged in construction of meaning<br><br>socialising is possible, enhancing motivation to participate<br><br>promotes intercultural sharing, since writing in | computer-mediated communication is a fully interactive medium |

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| | | another language is easier than speaking<br>intimate context makes computer-mediated communication suitable for personal counselling | |

**Limitations of Computer-Mediated Communication**

| Accessibility | Costs | Teaching functions | Interactivity |
|---|---|---|---|
| participation in computer-mediated communication requires equipment, software, connectivity, and expertise in keyboarding, uploading and downloading, and so on | costs of equipment and connectivity continue to be prohibitive in the developing world<br>cost of time to learner requiring training and practice in computer and connectivity skills also needs to be considered<br>writing and responding to messages is very time-consuming | writing takes longer to produce and to read than speech<br>less confident learners tend to be dominated by those more confident<br>teachers require social and communications skills and time to facilitate discussion appropriately<br>a poor medium for decision-making processes or convergent thinking<br>lack of focus on personal characteristics can lead to overheated discussions | interactivity is inhibited by lack of keyboard and connectivity skills<br>the much vaunted time for reflection produces no pressure to respond and the silence in many conferences is deafening |

### Web-based instruction

Web-based instruction uses the World Wide Web as the medium, utilising the attributes and resources of Web.

The Web involves 'hypertext' – (text only) and hypermedia – (sound and pictures) as well. Hypertext and hypermedia are called 'interactive' because learners can determine their own path through them, although there is no necessary link with the teacher.

Hypermedia are called 'integrated media' also, because the data are integrated in digital form on the same system.

A simple way to think of these media is as specialised, specially arranged databases. The computer is used to store information in many 'screenfuls', each linked to others by means of 'hot links' or 'hot buttons' highlighted in colour on the screen. By 'pressing' these buttons (clicking on them with the mouse) the user can browse through the information, choosing a route.

To produce a Web database, the author has to organise into 'chunks' or screenfuls the knowledge being taught. This requires the author to decide how to link the chunks, keeping in mind that the user or learner has to navigate among them and is not likely to 'visit' them all.

Navigation can be awkward. It takes considerable practice and, if possible, training in effective techniques for using the various Web browsers and other tools available, in order to become comfortable with this process. The process is also much enhanced and facilitated by fast equipment and a broadband, high-speed link with the Internet.

*Examples*: Many examples of current courses are available on the Web, representing various types of communication and potential interaction between instructors and learners. Examples of overall collections of Web sites highlighting courses with significant Web involvement include:

- The World Lecture Hall (http://www.utexas.edu/world/lecture/)
- Web Based Courses (http://ezinfo.ucs.indiana.edu/~smalikow/courses.html)
- World Wide Web Development Listserv (http://www.personal.psu.edu/faculty/wdm2/chap23.htm)

*Examples of Web-based courses*:

*Situated Cognition, University of Connecticut*: A doctoral seminar using the Web as an alternative mode for the distribution of class-based information, including course objectives and requirements, assignments, topic outlines, reading lists.

*Educational Technology, San Francisco State University*: The instructor uses both dissemination and facilitation techniques to provide an extensive collection of 'handouts' for each class session, as well as using electronic mail support and the creation of Web-based forms to solicit learner questions and comments.

*Applied Educational On-Line Technologies, University of New Brunswick*: This instructional site delivers instruction through a totally on-line, constructivist model. Learners learn by doing through a learner-centred approach, including activities such as submitting proposals via e-mail, developing Web pages, posting projects on the site, and posting reflective learner papers. Communication among learners and faculty is carried out through computer conferencing and a variety of listservs, which also serve as the primary channel of facilitation by the instructor.

The case study for the Open Learning Information Network which is included in this kit describes an organisation that provides courses exclusively on the World Wide Web.

## 4. Practice exercise

### *4.1 The Lego â block version of communicating for learning without visual cues*

*Instructions*:

- Divide your participants into pairs.
- Ask each pair to sit with their backs to each other, so they cannot see each other.
- Designate one member of each pair the 'teacher' and the other the 'learner'.
- Provide each pair with identical sets of blocks (about ten blocks per set is usually sufficient).
- The 'teacher' of each pair is to construct something using all the bricks he or she has been given, at the same time 'teaching' the 'learner' how to do it. In other words, as the teacher builds a structure, he or she instructs the learner step-by-step how to build the identical structure.
- Give each pair time to complete their task; about fifteen minutes is usually ample time.
- Then ask each pair to compare the structures they have constructed.
- Debrief by having the group as a whole describe and discuss what they learned about communicating for instruction without visual cues. What strategies work? What strategies do not work?
- The game can be repeated, giving each pair a different set of blocks than they had initially, and asking them to switch 'teacher–learner' roles. This time you give them different instructions: only the teacher may talk; the learner may not ask questions or make comments. This task simulates the kind of instruction that happens by radio.

*Timeframe:* Allow one hour.

*Materials*: Lego® bricks.

### *4.2 The paper and pencil version of communicating for learning without visual cues*

*Instructions*:

- Divide your participants into pairs.
- Ask each pair to sit with their backs to each other, so they cannot see each other.
- Designate one member of each pair the 'teacher' and the other the 'learner'.
- Provide the 'teacher' of each pair with a photocopy of a sketch of some kind. Some complex geometric shape that is not easily labelled usually works well. Give the 'learner' of each pair a piece of paper and a pencil.
- The 'teacher' of each pair is to teach the 'learner' how to draw the sketch, without the 'learner' being able to see the original at any time.
- Give each pair time to complete their task; about fifteen minutes is usually ample time.
- Then ask each pair to compare the results, both with the original and with each other.
- Debrief by having the group as a whole describe and discuss what they learned about communicating for instruction without visual cues. What strategies work? What strategies do not work?
- The game can be repeated, giving each pair a different sketch than they had initially, and asking them to switch 'teacher–learner' roles. This time you can also give them different instructions: only the teacher may talk; the learner may not ask questions or make comments. This task simulates the kind of instruction that happens by radio.

*Timeframe*: Allow one hour.

*Materials*: Photocopied sketches with paper and pencils.