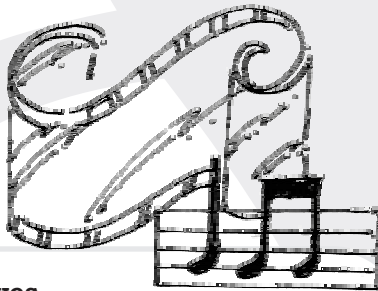


Multimedia as an Educational Tool

2



Objectives

At the end of the section, you will be able to

- Define multimedia as propounded by authorities and construct your own definition of multimedia;
- Describe the use of multimedia in educational settings; and
- Explain the advantages and disadvantages of multimedia.

For many of us, the lure of computers is a powerful one. However, many of us also refrain from using computers for fear of failure. We want to hone computer skills, but are scared to make the effort because we lack those very skills. Too many of us, especially in the field of learning, are caught in this modern tug-of-war.

Throughout the 1980s and 1990s, the concept of multimedia took on a new meaning, as the capabilities of satellites, computers, audio and video converged to create new media with enormous potential. Combined with the advances in hardware and software, these technologies were able to provide enhanced learning facility and with attention to the specific needs of individual users.

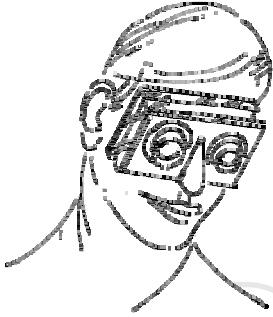
A primary application of the interactive multimedia for instruction is in an instructional situation where the learner is given control so that he/she may review the material at his or her own pace and in keeping with his/her own individual interests, needs, and cognitive processes. The basic objective of interactive multimedia material is not so much to replace the teacher as to change the teacher's role entirely. As such, multimedia must be extremely well designed and sophisticated enough to mimic the best teacher, by combining in its design the various elements of the cognitive processes and the best quality of the technology. With today's multimedia courseware, once a programme has been designed and built in with the appropriate responses, it should be flexible and permit change and alteration.

In this section of the handbook, we shall look at the usage, advantages and disadvantages of multimedia in education and training. Some of the prototype multimedia lessons are also given at the end as examples.

Definitions

"Multimedia" is a term frequently heard and discussed among educational technologists today. Unless clearly defined, the term can alternately mean "a judicious mix of various mass media such as print, audio and video" or it may mean the development of computer-based hardware and software packages produced on a mass scale and yet allow individualized use and learning. In essence, multimedia merges multiple levels of learning into an educational tool that allows for diversity in curricula presentation.

"Multimedia is the exciting combination of computer hardware and software that allows you to integrate video, animation, audio, graphics, and test resources to develop effective presentations on an affordable desktop computer" (Fenrich, 1997).



Specific uses of multimedia include:

- drill and practice to master basic skills
- the development of writing skills
- problem solving
- understanding abstract mathematics and science concepts
- simulation in science and mathematics
- manipulation of data
- acquisition of computer skills for general purposes, and for business and vocational training
- access and communication to understand populations and students
- access for teachers and students in remote locations
- individualized and cooperative learning
- management and administration of classroom activities

“Multimedia is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program” (Phillips, 1997).

Today's multimedia is a carefully woven combination of text, graphic art, sound, animation, and video elements. When you allow an end user, i.e. the viewer of a multimedia project, to control 'what' and 'when' and 'how' of the elements that are delivered and presented, it becomes interactive multimedia.

As such multimedia can be defined as an integration of multiple media elements (audio, video, graphics, text, animation etc.) into one synergetic and symbiotic whole that results in more benefits for the end user than any one of the media element can provide individually.

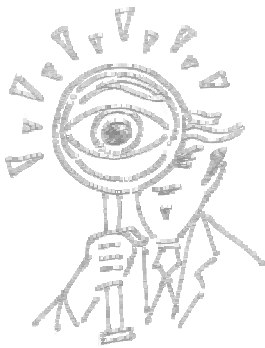
The need for making multimedia courseware

Why use multimedia at all? Of what use is multimedia in education? The answers to these questions could be sought through an understanding of the capabilities and limitations of the medium.

Besides being a powerful tool for making presentations, multimedia offers unique advantages in the field of education. For instance, text alone simply does not allow students to get a “feel” of any of Shakespeare's plays. In teaching biology, an instructor cannot make a killer whale come alive in a classroom. Multimedia enables us to provide a way by which learners can experience their subject in a vicarious manner. The key to providing this experience is having simultaneous graphic, video and audio, rather than in a sequential manner. The appeal of multimedia learning is best illustrated by the popularity of the video games currently available in the market. These are multimedia programmes combining text, audio, video, and animated graphics in an easy-to-use fashion.

Moreover, under conditions of chronic under-funding, multimedia can provide an enhanced or augmented learning experience at a low cost per unit. It is here that the power of multimedia can be unleashed to provide long-term benefit to all. Multimedia enables learning through exploration, discovery, and experience.

Technology does not necessarily drive education. That role belongs to the learning needs of students. With multimedia, the process of learning can become more goal oriented, more participatory, flexible in time and space, unaffected by distances and tailored to individual learning styles, and increase collaboration between teachers and students. Multimedia enables learning to become fun and friendly, without fear of inadequacies or failure.



Benefits to Learners

- Work at own pace and control their learning path
- Learn from an infinitely patient tutor
- Actively pursue learning and receive feedback

Advantages of multimedia

The pedagogical strength of multimedia is that it uses the natural information-processing abilities that we already possess as humans. Our eyes and ears, in conjunction with our brain, form a formidable system for transforming meaningless sense data into information. The old saying that "a picture is worth a thousand words" often understates the case especially with regard to moving images, as our eyes are highly adapted by evolution to detecting and interpreting movement.

For example, a photograph of Ganges in Varanasi, apart from being aesthetically pleasing, can contain a wealth of information relating to the culture, religion, geography, geology, climate, history, and economics of the area. Similarly, a recording of a politician's speech can allow us to discern significant semantic features not obvious in a written transcript.

For the student, one advantage of multimedia courseware over the text-based variety is that the application looks better. If the courseware includes only a few images at least it gives relief from screens of text and stimulates the eye, even if the images have little pedagogical value. More often than not, the inclusion of non-textual media into courseware adds pedagogical value to the application. For example, a piece of courseware describing a dig at an archeological site would be more valuable to the student, if it included images of the site, such as enhanced aerial images showing features like old field boundaries, or diagrams illustrating where the digging and scanning took place. In this respect, using the text only, even in a creative way, has obvious limitations as compared to the use of both text and pictures.

Practical disadvantages of multimedia

Multimedia requires high-end computer systems. Sound, images, animation, and especially video, constitute large amounts of data, which slow down, or may not even fit in a low-end computer. Unlike simple text files created in word processing, multimedia packages require good quality computers. A major disadvantage of writing multimedia courseware is that it may not be accessible to a large section of its intended users if they do not have access to multimedia-capable machines. For this reason, courseware developers should think very carefully about the type of multimedia elements that need to be incorporated into applications and include only those that have significant value.

Multimedia has other weaknesses too. While proponents of this new technology are very enthusiastic about its potential, they often leave the financial and technical issues unattended. Development costs in multimedia are very high and the process of developing effective multimedia takes time. Time spent on developing the

multimedia package requires money so that the true cost of an interactive programme mounts with each delay.

Further, if the prerequisites for using multimedia include *access* to computers with related software, the user must possess a minimum level of computer literacy in order to exploit the capabilities of this medium for learning. And finally, *training* of the educator who is unfamiliar with the production and design of multimedia courseware or packages can be equally complicating.

The critical question, then, is: How do we overcome some of the identified barriers and begin the process of multimedia implementation alongside the instructor, textbook, and blackboard? It is the barriers rather than the technologies which we must address before multimedia, or for that matter, any media technology becomes as accepted as the printed text or guidebook.

Use of multimedia in an educational setting

Let us look at some examples of what is called “innovative use”. Let us say a student wants to write a paper on desert animals. Traditionally, the primary source for obtaining information would be the encyclopedia generally available in the library. With access to interactive multimedia, the student would collect various textual materials about the camel from sources on a CD-ROM. In addition, the student may be able to copy a diagram or the skeleton and muscular structure of the camel and the ostrich to study what is common about the two creatures. With a multimedia approach, the student could also access Web sites on the Internet to get more information. The student could then add film clips on these animals in their natural habitat (all may be from the same CD-ROM) and blend them into a report. Then by adding titles and credits, the student now has a new and original way of communicating his/her own individual perspective.

Besides student use, teachers should find multimedia of great use in delivering their lessons. For example, a history teacher could use a multimedia CD to create a lecture on the non-violence movement by using film clippings and audio tapes on Mahatma Gandhi or Martin Luther King, also by incorporating other audio visual information with text to make the subject come alive. All this material would be available on a videodisc.

Similarly, a university professor might use a multimedia CD to prepare or to update information or to teach so as to enliven and also add insight to his/her teaching, thereby improving the quality of the course. The uses of multimedia need not be seen as a tool for classrooms only. In an industry dealing with hazardous materials, workers need to be trained. It could be risky to provide hands on training. In this case, simulated learning can take the place of actual hands on training by using all



Benefits to Teachers

- Allows for creative work
- Saves time for more challenging topics
- Replaces ineffective learning activities
- Increases student contact time for discussion

the features of interactive multimedia. Training can thus take place individually at the learner's pace and on his/her own time. Medical procedures, first-aid training and instruction of paramedics or even surgeons are made both simple and interesting through the use of multimedia. The doctor or paramedic can run through a complete procedure on videodisc and analyze all the possible outcomes and can evaluate the possibilities before treatment of the real life patient starts.

In all the above instances, the user can and normally does work individually and in an interactive mode with the medium.

In the next section we look at the hardware and software required for development of educational multimedia.