



MULTIMEDIA APPLICATIONS IN EDUCATION

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Multimedia Systems:

The word "multimedia", one of the buzzwords of the '90s, refers to technology that presents information in more than one medium, including text, graphics, animation, video, music and voice. Multimedia is defined as a tool of integrating the traditional media (text, image) and continuous media (video, audio) and to provide the possibility for a spectrum of new applications, with global communication, social and legal implications (Steinmetz and Klara Nhrstedt, 2001). The term 'multimedia' was used to mean a "collection of media emanating from desperate presentation devices", (Banker and Tucker, 1990), such as learning packages, consisting of printed materials, slides, audio tapes, and so on. In the 1990s, the term refers to "a class of computer driven interactive communication systems which create, store, transmit and retrieve textual, graphic and auditory networks of information" (Gazeski, 1992). Multimedia personal computers are powerful microcomputers that include sound and video capability, run CD-ROM disks, and allow users to play games or perform interactive tasks.

The emergence of multimedia is similar to what happened when talkies replaced silent movies. Talkies were distinctly more lifelike and natural. Multimedia does the same for computing technology along with integration of sound, animation, graphics, still images, video, text and music (Fred T. Hofstetter, 1998). Multimedia is an integrated system with different relations and to synchronize among the media. It is a technology of connections and binding different components partially and in isolation from each other (Steinmetz, 1999). Multimedia delivers information in a variety of ways but achieves greatest effectiveness through interaction. The technical and aesthetical integration of information, images and music convey the message with the focus on the single specific purpose. The technology provides a more effective presentation for less expense is an added advantage. In brief, the term multimedia describes the use of different media and technologies to present information from the pool of instructional resources; Multimedia threads an efficient way in presenting information for a courseware unit.

History of Multimedia:

Multimedia technology has changed the way how computers are perceived. The first computers were seen as single purpose machines that solved incredibly complex mathematical problems, large corporate database and financial systems. The computer terminals throughout an organization were used for publishing and information management during early seventies of this Century. Since the late 1970s, desktop computers used in the home and office have evolved into sophisticated systems that help us get our jobs done, deliver information, and provide entertainment.

Since the late 1980s, multimedia technology and applications have found many places in our lives. The 1980s brought the desktop computer and hence everyone could have a computer at his desk for word processing, spreadsheets, and even games. Bringing the computer to the individual into office, the home and the classroom look at the computer as more than just a fancy typewriter or automated bookkeeper. In the mid 1980s and into the 1990s, computer developers started looking at how computers could be used as never before. At the same time, advances in technology brought about:

- Faster desktop computers.
- Increased working memory capacity in computers.
- Higher data storage capacity in disk drives and CD-ROMS.
- Digital audio and video.
- Graphic operating systems that worked by pointing and clicking at objects on the screen instead of having to remember cryptic command sequences such as "dir" *exe* to find a programme.
- Local and wide area network that connected users to the world.
- Thousands of applications ranging from word processors to a myriad of multimedia products that have changed the work place, classroom and the home.

Elements of Multimedia System:

A multimedia system is a group of workable elements combined together to achieve a presentable format. These elements are familiar from the worlds of film, video, broadcast television, music and telecommunications as well as computing. The elements are

- A microphone
- A processor, typically a personal computer or workstation that has been enhanced to handle audio and video.

- A screen that can display high quality still images and moving video as well as computer-generated text, graphics and animations.
- A variety of methods by which the user can interact with the system such as key board, mouse, joy stick, touch screen, light pen, mobile phones, Digital camera or a handcam.
- A way to playback pre-recorded source material, usually from some form of optical disk, such as compact disk.
- Speakers to allow speech and music to be output.

Components of Multimedia System:

Multimedia System can be made applicable in a wide range of fields, the various components of Multimedia systems which make the applications in a more presentable manner include Audio application, Video application, Text and image database, Hypertext & Hypermedia, Computer graphics, Image applications and Animation.

Computer Animation Technology:

Animation occupies a significant place in the multimedia instructional approach. Animation is a sequence of still images with time for generating sequence of frames to give the impression of motion. The frames consist of graphical images with a slight difference in every individual frame. When these are projected on to a screen in a sequence, the impression of movement is produced. The term 'computer animation' generally refers to any time sequence of visual change in a scene. In addition to changing object position with translations or rotations, a computer-generated animation could display time variation in object size, colour, transparency or surface texture.

Changing camera parameters such as position, orientation and focal length can also generate computer animations. One can also produce computer animation by changing lighting effects or other parameters and procedures associated with illumination and rendering. Some typical application of computer-generated animation is entertainment (motion pictures and cartoons), advertising, scientific and engineering studies. The college students have more opportunities to learn from animated software of different disciplines. The teacher can make the learners watch an animation sequence, where the learners can observe all that activity happening in the digital imaging system and the digital printing devices – all for deeper understanding and better recall abilities. Students complete their assignment on a computer without worrying about it going awry.

Multimedia Medium:

A multimedia computer system is one that is capable of input or output of more than one medium. Although text and images are in fact distinct carriers of information, hence the usage of multimedia is not preferred. After all, newspapers with text and images are not considered to be multimedia publications. The term medium can also refer to an input device such as a keyboard, mouse, microphone, camera, or other sensor. "Multimedia systems strive to take the best advantage of human senses in order to facilitate communication." (Blattner and Danneberg, 2003).

Perception Medium:

Perception media help humans to sense their environment. Humans perceive information in a computer environment in such a way that the perception of information occurs mostly through seeing or hearing the information. For the perception of information through seeing, the visual media such as text, image and video are used. For the perception of information through hearing, auditory media such as music, noise and speech are relevant. The difference among media can be further decomposed into different video scenes, which again are composed of individual images.

Representation Medium:

Representation media are characterized by internal computer representation of information. The computer information is coded in various formats that are used to represent media information in a computer. Some of the representation media are

- A text character is coded in ASCII or EBCDIC code.
- Graphics are coded according to CEPT or CAPTAIN videotext standard. The graphics standard GKS can also serve as a basis for coding.
- An audio stream can be represented to using a simple PCM (Pulse Coding Method) with a linear quantization of 16 bits per sample.
- An image can be coded as a facsimile (the group 3 according to the ISO Standard Specification) or in JPEG format.
- A combined audio/video sequence can be coded in different TV standard formats (e.g. PAL, SECAM and NTSC), and stored in the computer using MPEG format.

Presentation Medium:

Presentation media refer to the tools and devices for the input and output of information. The media through which information is delivered by the computer or introduced into the computer are the media like paper, screen and speaker. These media are used to deliver the information by the computer (output media); keyboard, mouse, camera and microphone are the input media.

Storage Medium:

Storage media refer to a data carrier which enables storage of information. However, the storage of data is not limited only to the available components of a computer. The information will be stored in secondary storage devices like Microfilm, floppy disk, hard disk, and CD-ROM besides paper with print.

Transmission Medium:

The transmission medium characterizes different information carriers that enable continuous data transmission. Therefore, storage media are excluded from this kind of medium. Information is transmitted over networks, which use wire and cable transmission, such as coaxial cable and fibre optics, as well as free air space transmission, which is used for wireless traffic.

Information Exchange Medium:

The information exchange medium includes all information carriers for transmission (i.e. all storage and transmission media). The information can flow through intermediate storage media, where the storage medium is transported outside of computer networks to the destination, through direct transmission using computer networks, or through combined usage of storage and transmission media (i.e. electronic mailing system).

Application of Multimedia:

Multimedia is more than a high technology buzzword; it is a powerful way to educate, entertain, and inform. It has taken the computer from communicating information as text to telling stories using pictures, sound and video. Multimedia has taken computer users from intimidating mainframe terminals to high-technology desktop systems that offer fun, adventure, and interactive learning.

Multimedia technology is one of the main reasons for the fact that the computers are becoming as common in the home as they are in the workplace. Multimedia products are based on a technology that combines text, pictures, sound, full-motion video and interactivity into interesting, informative, and often entertaining production. Multimedia products are used by everyone from children to adults to meet a wide range of needs, such as:

- Finding facts and information in encyclopedias on CD-ROM.
- Learning new concepts and skills in mathematics, science, art and languages from home-based and school-based computers.
- Entertainment from computer games.
- Marketing and technical presentations for business.
- Communicating with individuals and corporations all over the world via the Internet.

Information Delivery Applications:

Vast collection of data are in the form of books, catalogues, libraries, audiotapes, videotapes or still photographs. Any of these can be captured in digital format and presented by a multimedia computer. This fast and modern method of transacting the data is called 'information delivery' and such data can be stored with the help of CD-ROM disc. Multimedia storage and retrieval system can contain more information than any human training agent can possibly embrace, and have many terminals through which students have access to the information.

Business Applications:

Selling combines information delivery with other capabilities such as demonstration, quotation, negotiations, order taking and so on. Programming in an authoring language usually does authoring for sales application. This is because these applications combine multimedia information delivery with other computer tasks such as preparing orders, contracts or invoices.

Productivity Applications:

This class of application is a combination of information delivery and training. Productivity applications such as spreadsheets, charting programmes or database programmes create screens that are displayed to show the user's data or calculations. It is valuable if the user can add multimedia objects to these screens so that he can use audio or video to support or explain his screens. A server knows all about multimedia and can run audio, video or other multimedia objects on command from another application via PC.

On-line Education and Virtual Classroom:

On-line instruction is the most recent form of what is generally termed as 'distance education', which includes satellite courses, computer-based programmes, video instruction, educational television, correspondence or home study courses. These methods attempt to move educational, centralized classroom to students who are unable to attend classes at a central site. On-line education represents a learning domain unlike any other technology-based academic delivery system. It incorporates the group qualities of interactive classroom-based learning while providing individual students the flexibility to participate in a graduate or post graduate programme at their own time and place. Personal computers and modems are the vehicle for communication. The most important academic benefits of on-line education through multimedia are critical thinking and learning at students' own time and place.

Tele Conferencing:

With the teleconferencing, one can participate in a meeting without leaving his desk or workstation and he can still obtain the kind of audio-visual experience he would get by travelling to a live meeting. The key is a high speed digital network connecting all systems and most corporations are installing such networks. Teleconferencing can also consist of using closed circuit television to reach large groups at multiple sites. Several major communication carriers and hotel chains now offer teleconferencing services for such events as sales meetings, new product announcements, employees' education and training, e-governance in states like Tamil Nadu in India and in Indian Court of Laws for hearings and proceedings.

Video Conferencing:

Video conferencing is real time video application through multimedia between two locations or multipoint, which can include several conference sites depending on the system capabilities. The CD-ROM technology, videodisks and video software installed in PC created opportunities for new applications in the office. Users in decentralized work groups are able to use multimedia to support collaborative projects. As one user modifies the document on-screen, the changes will appear on the copy of document in the user's computer. Multimedia plays an important part in software that supports such cooperative working, known as Groupware.

Geographic Information System (GIS):

The management of facilities such as buildings, roads, power lines and railroad tracks is a problem that concerns government offices, utilities and many industries. Specially designed computer database management system called 'geographic information system' is available to provide on-line support for these types of applications.

Virtual Reality:

Virtual Reality (VR) is a computer-stimulated reality. It is a fast growing area of artificial intelligence that had its origin in efforts to build more natural, realistic, multi-sensory human/computer interfaces. Virtual Reality encompasses a range of interactive computer environments, from text oriented online forums and multi-player games to complex simulations that combine audio, video, animation or three-dimensional graphics. One can experience computer stimulated "Virtual Worlds" three-dimensionally through sight, sound and touch with special devices such as head set with video goggles, and stereo earphones or a data glove or jumpsuit. Thus Virtual Reality is also called Telepresence. One can enter a computer generated virtual world, look around and observe its contents, pick up and move objects and move around it at will. Virtual Reality is also used in some amusement parks and to simulate construction designs, high temperature chemical experiments and even in nuclear fission or fusion. Experimental and envisioned users include education, industrial design, surgical training and scientific experiments.

Conclusion:

Computer developers started looking to multimedia the delivery of information using text, pictures, audio, and video as a way to utilize computers in a uniquely personal way. Multimedia computers could be used to increase efficiency and productivity on the job, provide information at fingertips in the home, and help students learn more effectively both in and out of the classroom. These personal gains meant that people would see computers as practical and useful tools in their everyday lives. The impact of multimedia technology on our daily lives is often more than what actually realized about the use of multimedia. The bottom line is that if there is a need to inform, teach, or entertain multimedia technology can play a key role. The miraculous changes in the field of multimedia technology did not happen overnight. From the facts listed above, one can be sure of the multimedia technology and its applications in nearly every aspect of our lives. The multimedia presentation capability can show the student, material from any kind of source: text, charts, audio, video, animations, simulations or photographs. When these are combined with interactivity, an effective learning environment is created.

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