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Use of online technology for multimedia education

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Abstract. With the advent of Information communication technology (ICT) and the growth of Internet, particularly the Web has changed the way of giving the curriculum materials to the students in online environment. Along with the print material, the materials are given in e-formats also. The online teaching tools like e-mail, discussion list, chat mode, lecture notes via web, use of computer mediated communication, interactive web tutorials, CD-ROM materials and virtual environments helps now-a-days for better understanding by the student community. The successful use of online technology depends on well designed and planned courses, infrastructure and price considerations, capacity and training in the chosen technology, local design and proper pre-testing and relative ease of access for the students. Technology such as video and the internet can be combined with hands on activities to enhance critical thinking and support learning skills. The author focused that the content, media and administration are the main areas for better multimedia education using online technology. In India, distance education is provided through Radio, TV, CD-ROMS and contact classes on weekly holidays. Some private institutions have started using the online technology for educating the students. The author concluded that Indian Universities and Higher Educational Institutions should adopt this technology for easy understanding of education programmes.

Keywords: Education, curriculum, online teaching, tools, multimedia, CD-ROM

1. Introduction

Internet and the multimedia enrich the student community for accessing the educational materials. The World Wide Web (WWW) offers educators a new medium to deliver teaching and learning material, allowing flexibility for learning from home or workplace and the ability to cope with a widening variety of backgrounds and qualifications. The difficulty comes in finding ways to apply the new technologies to a learning process with proven educational benefit. Recently the university lecturers have received the training and skills needed to exploit the Web, and they have found it approachable and less technical than expected in general. Broadband Internet access opens up new opportunities and new challenges for tertiary education to go online, that is, for educational services to be delivered to students at home and in their workplace, overcoming the time and travel constraints of conventional place-based face-to-face educational methods. Thus, Internet-delivered online multimedia education (OLME) is developing into a major mechanism for the provision of off-campus education. In this OLME, a student uses a personal computer to access an educational server computer, the latter typically at a university or other educational service provider. This article deals with the online teaching techniques using multimedia.

2. Definition analysis

2.1. Online education

Online education is defined as the creation and proliferation of the personal computer, the globalization of ideas and other human acts, and the use of technology in exchanging ideas and providing access to more people. Audio, video, computer and networking technologies are often combined to create a multifaceted instructional delivery system. The fundamental method to unite the distance learning instructor with the distance learner is the network. Networks suitable for distance learning implementations include satellite, cable modem, digital subscriber lines (DSL) and wireless cable (Collins, 2002).

Other terms for on-line education are virtual education, internet-based education, web-based education and education via computer-mediated communication. The web-edu project uses a definition of online education that is based on Desmond Keegan's (1988) definition. It is by:

(1) The separation of teachers and learners which distinguishes it from face-to-face education;
(2) The influence of an educational organization which distinguishes it from self-study and private tutoring;
(3) The use of a computer network to present or distribute some educational content; and
(4) The provision of two-way communication via a computer network so that students may benefit from communication with each other, teachers and staff.

2.2. Multimedia

Multimedia is any combination of text, graphics, art, sound, animation and video with links and tools that let the teacher/learner navigate, interact and communicate with the computer. They are integrated and linked together in some way that offers users the ability to browse, navigate and analyze these materials through various searching and indexing features. It has the capacity to deliver large amounts of materials in multiple forms and to deliver them in an integrated environment. When you allow the user (the viewer) to control what and when these elements are delivered, it is interactive multimedia. When you provide a structure of linked elements through which the learner can navigate, interactive multimedia becomes hypermedia. One needs to understand how to tie the elements together using educational multimedia computer tools. If done properly, interactive multimedia excels in leaving lasting impressions in the teaching/learning process. Nearly all PCs are capable of displaying video, though the resolution available depends on the power of the computer's video adapter and CPU. Multimedia applications incorporate a full range of available facilities in order to enhance the communication between the author/creator of a multimedia application and the reader.

3. Importance of multimedia

Multimedia is changing the nature of reading itself and makes reading dynamic by giving words an important new dimension. Words in multimedia serve as triggers that readers can use to expand the text in order to learn more about a topic. This is accomplished not only by providing more text but by bringing it to life with sound, pictures, music and video. Multimedia educational computing is one of the fastest growing markets in the world today. The new tools are enabling educators to become developers and individuals to produce multimedia desktop video productions. Commercial and educational available generic courseware to support commercial products is emerging. These materials can be called up instantly for cooperative learning, critical thinking, discussions, problem solving and self-study.

4. Multimedia tools

Some of the multimedia tools required for online education are: Multimedia application enabling software, Hypermedia, Multimedia Authoring Tools, Multimedia databases and retrieval, System software support for multimedia, System hardware support for multimedia and the performance measurement tools for multimedia.

Other Multimedia Resources, Tools, Plug-Ins, Demos, Course Templates like Multimedia Educational Materials of different kinds namely HTML Resources like WebEdit Pro, FrontPage, HotDog Pro and HotMetal Pro, the Image Enhancement Tools like Gif Construction Set with its tutorial and samples, Lview, PaintShop Pro, CorelDraw, and Photoshop, the Java resources like Sun – Calgarian wrote Java and Shlurrrpp . . . Java learning Java – The Java Tutorial for Java programming, for viewing Multimedia, Streaming Video Viewers like RealPlayer, Live Audio/Video, VDOLive, NetToob and CU-SeeMe Desktop Videoconferencing, Sound Players like Real Audio and Plug Ins like VRML Shockwave, Quicktime, etc. are to be provided.

5. Methods of teaching/learning

Higher Education (HE) is undergoing changes in many parts of the world. Universities and technicians, or polytechnic institutions keep on examining both the methods of teaching and learning and the use of resources within their institutions. There is also a trend towards lifelong learning, leading to an emphasis on "learning to learn" and the need to accommodate different learning styles, customization and alternative learning routes. There have also been further development and expansion of information technology, with videotapes, CD-ROMs, computer networks and the Internet being introduced to various institutions of higher learning. Radical changes in the HE sector within the last ten years have impacted upon the educational environment of all institutions. The organizations should plan the course material, the access and delivery mechanism, the better infrastructure for users as well as for the creators and pre-testing has to be done for results. It helps for better access and utilization of the multimedia material for education.

6. Characteristics of learners

De La Harpe, Kulski, and Radloff list the following characteristics of effective learners as they have clear learning goals; they use available resources effectively; they know about their strengths and weaknesses; they understand the learning process; they deal appropriately with their feelings; they take responsibility for their own learning; and they plan, monitor, evaluate and adapt their learning processes.

7. Online facility

In an online multimedia education, more study spaces for individual and group study in new Libraries/Learning Resource Centers or extensions to existing buildings, longer opening hours (24 hour access in some facilities), more work-stations and PCs in either Libraries, Learning Resource Centers or Computer rooms, arrangements for users to hire PCs and modems at advantageous rates, the networking of resources and provision of more CD-ROM and on-line databases, giving users access to e-mail and the

Internet and the provision of guides to the use of electronic resources, enlarged media and audio-visual facilities are to be provided.

Due to the online multimedia education, the need for resource based learning has forced to provide the enhancements to conventional courses for the lecture substitutes, self-contained 'tutorials in print', Self-pacing; alternatives to the lecture program which allow the student to progress at his or her own pace, Substitutes for specific learning activities, e.g., computer simulations of experiments, Support for learning activities, e.g., study guides, field guides, etc. and hybrids, i.e., systems which emphasize class contact and learning resources in varying degrees.

8. Online technologies

Some of the online teaching techniques for multimedia education are discussed below.

8.1. Internet

The Internet as a medium of learning is explored to the maximum for the creative use and positive impact of such knowledge on the learning process. Topics from recent advances in the subject are allocated to them. Through Internet search, the students acquire the latest know how on the assigned topics and able to get further information like related links, html linkages within the text, where multimedia information is mostly used.

8.2. E-mail

It helps for students to stay in touch with their peers and with the teaching staff. Questions can be asked and get it clarified or even chatting can be done. The reply may be of text with multimedia explanatory materials including audio and video.

8.3. Web-based Instruction (WBI)

WBI is defined broadly as any form of innovative approach for delivering instruction to a remote audience in which the Web is included as a tool [4]. Presently, several Web sites have been developed to provide learners with access to instructional resources from a distance. However, Hill noted that, most course-based or learning sites simply post course materials [2]. In such instances, use of the Web falls far short of the potential this medium affords. According to Casey, currently used Web models of learning can be identified as one of the followings [1]:

8.3.1. The Web as source of information

This is the simplest use of the Web.

8.3.2. The Web as an electronic book

Students use the screen to read materials, activate multimedia demonstrations and take self-correcting quizzes or other activities. The course material is mostly factual information, which is to be learned from the Web page and any accompanying media. There is no interaction between teacher and the students through the Web.

8.3.3. The Web as teacher

Some Web-based courses include some form of personal communication between students and other students via the use of email and perhaps chat rooms.

8.3.4. The Web as a communication medium between teacher and students

In this model, students learn from the teacher but "through" the Web and not "from" the Web. Thus, the Web acts as the communication medium for the necessary interaction. A model such as these aims to mirror a face-to-face learning environment, within which the students will be able to establish some form of human relationship with the teacher.

According to Reeves, WBI is not its rich mix of media features, but also the pedagogical dimensions that it can be designed to deliver [3]. The aim of Web-based education must surely be to develop a model, to enable a relatively large proportion of the student population to learn relatively easily and successfully [1].

8.4. CMC systems

Computer mediated conference (CMC) allow groups to interact over time as well as over geographical location. This is a different type of interaction supported by videoconference systems, which allow people to be geographically dispersed, but require them to be present at the same time. Other examples of asynchronous computer conferencing systems are Lotus Notes/Domino, FirstClass, TopClass and WebBoard.

8.5. Computer-assisted learning (CD-ROM)

The development of computer-based technology is contributing to effective science education, which has grown exponentially. The multimedia software available on CD-ROM plays a powerful role with applications in laboratories and lectures, tutorials and project work.

8.6. Virtual laboratories

They present a range of equipment on-screen and offer a very high degree of interactivity. During virtual laboratories students actively perform experiments themselves with simulated responses.

8.7. Teleconferencing

It is a new mixed model approach for distance education (DE) combining satellite teleconferencing with hands-on activity session. It was developed to adjust for many of the disadvantages associated with DE and traditional in-person training. The mixed model used live teleconference speakers, video clips, interactive call-in sessions and local sessions.

8.8. Quiz

The most encouraging one could be, conducting quiz for the students at various rounds, which inculcates the students a team spirit, leadership, better organizing abilities and interest and better comprehension of the subject. The quizzes help in improving memory power, scientific nomenclature and vocabulary and active learning through integrative reasoning, which helps in improving intellectual power.

9. Standards in courseware

9.1. Instructional Management Systems (IMS)

IMS attempts to address the problems of the perceived lack of open standards in courseware or learning materials and the systems needed to deliver these. It looks at the Standards for describing learning resources, Communication protocols between learning resources, Accreditation (possibly financial) for the subsequent use of learning resources and Systems to manage the overarching delivery and handling of learning resources (known as Learning Management Systems).

10. Transmission of material

The user-perceived quality of the OLME is predominantly related to latency, that is, the time from when the user requests a page to when that page appears on the screen. This latency is limited by the quality of the broadband access to the home, which in turn is limited by transmission technology and/or cost considerations. As the Internet progressively becomes a high-capacity, high-speed service, it is the client links which could be the throughput rate limiting bottleneck, having a dominant impact on latency. These client links may be wireless, such as local multipoint distribution service (LMDS) or they may be one of the digital subscriber loop (DSL) technologies. These technologies provide an IP-based downstream capacity of fixed upper bandwidth, able to be shared between a numbers of subscribers and used for various multimedia services such as OLME, video on demand (VoD) and telephony. Inevitably, the service provider will not install a dedicated channel capacity for each user.

11. Some examples

11.1. Educopolis

It is a European public and private cultural initiative (organized as a virtual city) offering a multimedia online system for the diffusion of culture, information and training – from the lower levels (introducing dropouts, disabled people, very young students to the elementary use of PC's), to Information Technology literacy and to advanced levels (mastery of mathematics and technical tools including post-doctoral tuition). It aims to raise average cultural levels with special attention to the needs of less favored citizens. The virtual buildings of Educopolis offer tuition in informatics, natural sciences, mathematics, communications, management, languages, online publishing, distance learning, energy, transportation, planning, technological forecasting, political science, cooperation theory, E-commerce, E-management, E-learning, E-all.

11.2. Indian scenario

There is a strong component of digital library (DL) in the Virtual Centre for Technology Enhanced Learning (VCTEL) focusing on the role of technology in knowledge accumulation, storing and dissemination of multimedia educational materials in the three sectors of university, industry and government. VCTEL is proposed to be set up by the Indian Institute of Technologies (IITs), Indian Institute of Managements (IIMs) and Carnegic Melon University aimed by providing DE, developing resources for core

courses, conducting joint Ph.D. program and setting up a DL. Training on Greenstone DL software has been conducted by National Centre for Science Information (NCSI) of Indian Institute of Science (IISc), Bangalore. University of Mysore is pursuing a project namely Vidyavahini, on digitizing theses and dissertations with the support from Department of Science and Technology. Lot of digital library projects are on for making the distance learning and teaching methods under E-Learning with the multimedia courseware.

11.3. Motorola Inc.

Motorola Inc. announced an online education project to link children in remote areas with teachers in other schools. Using the company's Canopy wireless broadband technology, Motorola will connect teachers and students by providing real time audio and video feeds to a cluster of recipient schools from a classroom in a nodal school. An always-on, high-speed broadband technology, Canopy is positioned by Motorola as a technology that is suited for providing Internet Protocol (IP) connectivity and providing services such as data, voice and video to locations where existing broadband infrastructure is not available or affordable. For this project the Schaumburg, Illinois company will provide the broadband wireless link as well as the computers and software required for connecting the nodal and recipient schools. The curriculum and content will be provided by the nodal school and made compatible with Internet through a non-governmental organization.

11.4. IGNOU, New Delhi

The Indira Gandhi National Open University (IGNOU), New Delhi, is providing contact classes as well as through Radio, TV and videoconferencing systems for the large number of students who have enrolled for the DE courses, wherein multimedia educational resources are fully utilized for better understanding by the students community by these methods.

12. Benefits of E-learning

Some of the benefits of e-learning by the use of online technology are:

- Enables education anywhere, anytime and to anyone.
- Facilitates self paced learning – flexibility to go the content at their convenient time.
- Cost savings – lot of amount can be saved in travel and downtime for regular classes.
- Learner focused – technology can personalize content and anticipate learner's future information learning needs.
- Measurable – secure and reliable systems for recording and capturing.
- Better learning outcomes – better outcomes in terms of learning and knowledge retention when compared to traditional methods of teaching.

13. Conclusion

The development of information technology and the increasing use of resource materials to supplement extend and even replace lectures and seminars. It is a challenging task to try and predict what the

future holds in store when blending education with technology. There will be few implications on e-learning at various level of access due to shared-capacity technologies. The multimedia course material definitely helps the students/learners for better understanding in the easiest way. Multimedia programs are always available directly from the publishers. Many programs are also available from distributors who distribute a wide range of programs. Often a distributor can get you material faster than the publisher. This can be a good way to acquire programs, though one should be careful that the packages are the kinds of programs that you want. The most important aspect is not the technology, but to make the student and the potential for customization the most important aspect of education.

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