Web-based Multimedia for Distance Learning

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*Abstract*Education is now engaged in a transitional period with respect to new technologies which is unique in its history. No previous technologies which have been proposed to "revolutionize" education have simultaneously had identical or equivalent revolutionary consequences for this world. Given the technological resources, dealing with the challenges to their effective utilization in education will focus on human-professional. To assist web-based multimedia for distance education, it is important to understand the characteristic and its educational concerns. This study was to identify characteristics of web-based multi-media for distance learning settings.

Keywords: web-based multimedia; distance learning

1 Introduction

Boundless assortments of technological options are available to the distance educator. These options include interactive audio-conferencing, one- and two-way video, computer conferencing, audio graphic systems, as well as printings. To assist distance learning with web-based multimedia, it is important to understand the characteristic and the educational concerns.

2 Problem of this Study

The purposes of this study were to identify characteristics of web-based multimedia for distance learning settings.

There were three major focuses of this study:

1. Needs of using multimedia for distance education.
2. Availability of Current Web-based Multimedia technology.
3. Educational concern of Web-based multimedia.

3 Literature Review

Related literature has been reviewed as foundation of this study. Characteristics of web-based multimedia were identified according to the evidence of literature and results of discussions. For achieving the purpose of this study, following topics were reviewed.

- Distance Education
- Concerns of Implementing Distance Education
- Multimedia
- Needs of Multimedia
- Web-based Multimedia

4 Distance Education

Distance education can solve many academic problems; it typically creates more than a few in the process. In resolving the problems that are sure to arise, study goal is clear: to capitalize on the strength of instruction while minimizing or eliminating the potential problems arising from its use. This is the challenge of distance education and the focus of this study.

The field of distance education has evolved a long time. As this evolution has unfolded, different phrases have been coined to describe the organizational framework and anticipated instructional outcomes that result. Phrases including "distance education," "distance learning," "distant teaching," "tele-work," "tele-learning," "outreach, and "tele-teaching have been used to describe the same basic process and outcomes. At its most basic Level, distance education takes place when a teacher and student(s) are separated by physical distance, and technology (i.e., voice, video, data, and print) is used to bridge the instructional gap[4] [15].

5 Concerns of Implementing Distance Education

The role and influence of distance education is currently in a period of evolutionary growth Mills[7] & Hovenga [6]. Early efforts in the field focused on print-based correspondence study courses and single-technology approaches to instructional delivery with few opportunities for teacher-student and student-student interaction. In contrast, recent trends seek to innovative integrate the unique characteristics of various voice, video, data, and print delivery systems. Over the past several years, researches exploring effective distance teaching efforts as well as evaluations of student attitude towards the use of distant delivery methods have resulted in some fairly consistent conclusions. These conclusions are worth considering when planning and implementing distance education programs, especially for rural and/or culturally diverse learners.

Research suggests that effective distance learning is more the result of preparation than innovation.

The research suggests, for example, that distance education and traditionally delivered instruction can be equally effective if the distance educator puts adequate preparation into understanding the needs of the student and adapting the instruction accordingly. A teacher's understanding of the target population and their instructional needs is equally as important as mastery of the content being delivered.

An important part of this preparation is finding content-related examples that are relevant to the distant students. While this can be time consuming, the literature suggests it is critical. An outgrowth of this finding suggests that culturally diverse

learners may require more individualized delivery approaches that take into account their cultural backgrounds and past life experiences.

As for delivery systems, the research suggests that there is no significant difference in the effectiveness of the delivery systems used, as long as the characteristics of the delivery system match content requirements. In other words, the content being presented and the capabilities of the delivery system must be complementary.

Hall [3] used levels of interactivity and amount of multimedia as the primary distinguishing factors between different programs and listed three types of programs, Type 1- Text and Graphics Web-based, Type 2- Interactive Web-based, and Type 3-Interactive Multimedia Web-based.

6 Multimedia

Computers, as we understand them today, came into existence about four decades ago. Originally, the computers supported only the computations related to research. As time progressed and with the technological advances, the computers became powerful contrivances and today they are an integral part of our day-to-day life. Perception, memory, thought, and reason, which are considered the basic traits of human beings, are being mimicked today by special systems that are built using powerful computers. These systems are able to 'talk', 'see', 'understand', 'listen', 'think', and 'communicate' although to a much lesser degree of perfection when compared to human beings. Specialized systems are built to perform dedicated tasks such as a class teacher, a librarian, an aircraft pilot, a mining engineer, and numerous other specialized tasks.

All these developments have one thing in common. That is, to automate the following functions: perception, retention, reasoning, and presentation. All four functions directly relate to the sensory, memory, and reactionary modes of behavior of human beings. There are basically two types of systems that are attempted; those which act as replacement for human beings and those which act as facilitating contrivances for human beings. The challenge to the computer technology, science, and engineering is in handling these functions efficiently; and the key to doing so is in understanding the nature of the information that is being perceived, stored, processed, and presented.

Information in the external world can be perceived in five different ways: sound, touch (or feel), scene (or visual), taste, and smell. Literally, multimedia means many media or multiple media. The user of the computing environment today gets input in the form of data, voice, video, image, graphics, or a combination of these. Similarly, the user generates information in one or more of these media. We can visualize the user as the focal point in the computing environment, who constantly accepts input from the external world in multimedia form and interacts with the external world with multimedia information. Pictorially, a modern user deals with a computing environment shown in Figure 1.

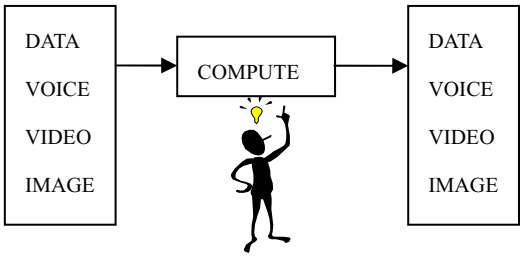

Figure 1. Computing environment of modern users

Currently, multimedia systems related research and development is being pursued by many research groups, often with different perspectives. There is a wide spectrum of work spanning creation, maintenance and retrieval of multimedia databases, synchronization and presentation of multimedia information, conferencing systems using multimedia, protocols for multimedia applications, networks for multimedia applications, performance of multi media systems, and quality of service relating to multimedia systems. In all these studies, researchers and developers have considered two types of applications: those that deal with multimedia information that is stored on a disk and those that deal with multimedia information that is generated live such as a conversation shot through video cameras and speech captured using a microphone during a video conferencing session. The information that is retrieved from storage is also referred to as persistent information. The term persistent refers to the information that is always available and not transient. The information that is generated live from devices such as video cameras or microphones are referred to as non-persistent information. The term non-persistent is used to refer to the information that is transient; there is no way to repeat if lost or corrupted.

7 Needs of Multimedia

Human beings have the natural ability to understand the information presented in the form of speech, photographs, or video sequences. Multimedia is much richer than the informative bits with which it is represented. For example, when we look at an organization's employee database, it is now possible to store the photograph of each employee, details such as age, salary, expertise, etc., and a short presentation by the employee himself. The database of today is very different compared to conventional databases. Also, for a user of this database, it is possible to flip through the photographs of the employees and pick up the details about an individual as opposed to a key-word search. In fact, the user of the multimedia database need not remember any specific detail regarding the employee other than a recollection of the face.

Another use of an employee database in multimedia form can be illustrated using the following scenario: If the presentations recorded by the employees contain the projects or assignments handled by the employee, then the employer can pick a team for a new project by searching through the voice presentation for relevant experience. The process of picking up a team for the new project is equivalent to having a meeting of all employees in which each employee

makes a technical presentation highlighting his skills. This is made possible because when we store the information, different media retain their original form. While in the normal form of storage in a database, every piece of information is encoded as a bit or a byte or a group of bytes, with a pre-assigned relationship, thereby losing the original character of the information.

Let us consider yet another example that uses the current information-generation technology. Until now, conferencing using computers only meant that the screen was subdivided into as many units as there were participants in a conversation, each one typing in what they had to express as opinion on the subject matter under discussion. The same conferencing will dramatically change once the input changes from simple keyboard interaction to display of slides, transparencies, computer-generated graphics (possibly with animation), annotation with the voice of the participant or from an expert as an extract from a database, and so on. In fact, the possibilities are limited only by the imagination of the user of this new environment supporting multimedia conferencing.

8 Web-based Multimedia

World Wide Web (popularly known as WWW) is a cooperative project initiated in 1989 at CERN8, Geneva, Switzerland, to design and develop a system for the integration of various types of information sources using hypermedia concepts. The motivation was to support collaborative research among physicists, who produce and exchange large volumes of information and are spread out geographically. It is successful sharing multimedia information on the Internet.

The interesting aspect of the WWW technology is the transparent access to any web site for information, thereby giving the user the impression of seamless inter-connectivity of information sources (known popularly as web servers) across LANs, WANs, Internet, or a combination of these. Though the technology appears to be uncontrolled and unregulated, there seems to be a voluntary adoption of discipline among the users. The information sources (often referred to as hyperspace, cyberspace, and so on) are linked among themselves, which when drawn on a sheet of paper looks like the web of a spider. For identification purposes, each unit of information that is linked into the cyberspace has an ID called Universal Resource Locator or URL. This idea has enabled a liberalized approach to information sharing anybody can author a document and at the same time optionally refer to anybody else's document - leading to contribution of research results to the cyberspace.

Discussion and Conclusion

Whenever we consider supporting distance education with web-based multimedia, following questions were raised and should be discussed.

- **Characteristics of Web-based multimedia**
- **Network Multimedia Database**

System

- **Multimedia Presentation System**
- **Multimedia Conferencing System**
- **Classification of Network Multimedia Applications**
- **Classification of Multimedia Information**
- **Current Trends**

9 Conclusion

- **Needs of using multimedia for distance education**

  According to the traffic loading data of web band width, multimedia of academic usage had shown rapid growing. The essential needs of implementing distance education made this trend possible.

- **Web-based Multimedia technology**

  Multimedia is one such application. It demands more in terms of processing, storage, and communications from the computer system. In addition to these, there has been a tremendous growth in coding technologies, technologies for application support, and system integration technologies.

- **Educational Concern of web-based multimedia**

  If teaching techniques and delivery methods take into account the needs, diversity, and context of distance learners, teaching at a distance can be effective. Technical innovation continues at a pace that is difficult to measure or monitor.

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