DEVELOPING MULTIMEDIA RICH WEB COURSES

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The effective use of technology in education can be time-consuming. The production of computer multimedia and web-based course delivery require a large investment in time and resources for the faculty. It is difficult for faculty to gather and coordinate the information and resources needed to develop and maintain meaningful distance learning courses. If faculty do begin work on a web-based course, they find it difficult to do more that to place large amounts of text on a few pages. However, with the rich possibilities of the combined elements on the web, such as, streaming audio and video, animation, virtual reality and data base connectivity -- simply placing a syllabus and some other text on the computer screen is not the most effective use of the medium.

A BRIEF HISTORY OF THE WEB

To better understand the limitations and possibilities of delivering multimedia on the web it is useful to understand how the Internet was built and first used. The Internet was originally created for U.S. defense purposes by the Advanced Research Projects Agency or ARPA of the United States Department of Defense in the late 1960s and early 1970s. In the 1980s the National Science Foundation expanded the use of ARPnet to create a network connecting supercomputing centers, universities, and research centers. The NSFnet began operation using 56Kbps dedicated telephone lines - equivalent to 56Kbps per second or about 7KB per second. By 1992 the network was upgraded to T3 lines, or 45 Mbps. This development made it possible to carry multimedia over the Internet backbone. Before this time it was not a possibility to use multimedia because multimedia on networks require high-capacity lines. In 1993, The U.S. National Center for Supercomputing applications (NCSA) released a free graphical browser for Unix systems called Mosaic. Mosaic was the first browser to use some of the elements that we associate with browsers today, the graphical user interface (GUI). The great step forward was that Mosaic provided the capability to view graphics directly in the Web page, and supported other media types, such as digital audio and animation, through applications on the client machine called helper apps. In 1994, the developers of Mosaic left the NCSA, and formed a company called Netscape Communications Corporation. In 1995, the NSF relinquished control of the network to commercial providers, which meant that commercial use was now acceptable. In 1995, Netscape Web browser, called Navigator became the most popular browser on the Web, in 1996 Microsoft entered the browser business with Internet Explorer. Both companies have provided support for multimedia data types such as; support for embedded Apple QuickTime movies and digital video, digital audio and three-dimensional virtual reality environments. Another major development in 1995-96 was the ability to incorporate Java applets in Web browsers and the widespread adoption of the Java programming language. Java applets are small programs that can be embedded in a Web page and downloaded and run on the users machine.

MULTIMEDIA ON THE WEB

Multimedia on individual computers or over the Web generally refers to the integration of text, graphics, audio, video and animation, such as embedding video, sound or VRML (virtual reality markup language) in a Web page. Also, there is the added possibility of the use of interactivity. Interactivity gives the viewer the capability of manipulating the features of the media being used. For example, with VRML animation the viewer can move around in a 3D environment or interact with the environment -- in a video embedded on a Web page the viewer can play, pause, rewind and change the volume of the video. Web browsers display multimedia content in three basic ways: 1) Native, inline - media that can be displayed directly on the web page without any added programs or viewers. For example, all graphical browsers support GIF graphics and many support JPEG graphics, therefore these graphics can be written directly into the HTML code. 2) Helper applications - this was the standard method of viewing multimedia on the Web in the early development. Multimedia content is downloaded to the viewers hard disk and then it is displayed in a separate player application, such as a MoviePlayer. 3) Inline with external code modules - For example Netscape compatible Plug-Ins or Java applets or Internet Explorer's OLE/ActiveX. These external so-called "mini-programs" enable the viewer to play back multimedia content directly on the Web page.

THE NETWORK AND CONNECTIVITY

Faculty that decide to produce multimedia content for their Web courses have to be concerned about another factor that is largely out of their control. However being aware of the ramifications of connectivity and bandwidth are needed. One of the largest roadblocks to delivering rich multimedia content on the Web is the time it takes for media to download. This download time can be effected by the size of the media that is used and therefore the smaller the content size the quicker the download. However, there types of media that can enhance a Web course will be much larger that simple text and photos. Although some multimedia display capacity, such as JPG compression and video playback from the hard disk are dependent on the speed and power of the viewers computer, the main limiting factor for multimedia on the web is long download times. Streaming technologies address this problem by enabling playback to begin before the download is complete. So because the top priority for producing multimedia content for the web is keeping the file sizes to a minimum to reduce the download time producers must balance between reduction in media quality and time of delivery.

STEAMING CONTENT

Streaming is the continuous delivery of time-based media, such as video, audio and animation to a client machine in real-time. The good thing about streaming is that the user doesn't have to wait for the file to be completely downloaded before

viewing the content. The remaining portion of the file is downloaded from the server in the background while the media plays on the client machine. Because the Internet was not designed to deliver continuous, synchronized, time-based data delivering streaming content can be tricky. Internet data is packet-based, which means it is sent asynchronously in discontinuous chunks. The system can not know when each discrete chunk of material will arrive at its destination, each chunk will bounce around the Internet looking for the best path until it finds the right one. This is why there is sometimes on slower connections stutters and gaps during playback. Usually a dedicated file server with proprietary software is needed to implement continuous playback.

CONCLUSION

The use of multimedia to enhance and illustrate web-based distance learning courses is not a frill it is the way to produce effective new courses. It is therefore important for faculty to not only understand the concepts behind the development of multimedia but to also have a good grasp of how to implement some of the processes involved with production. However, it would be unwise to believe that individual faculty can have the time or all of the tools to create everything needed for their courses. The model that will probably be the most successful is a team approach where faculty, student, staff and consultants work together to produce the finished product. This calls for a great deal of cooperation and planning but can be achieved when all parties are used most effectively. The process will work basically as follows: 1) students will be trained in the various software application needed to produce the kinds of media wanted, 2) faculty members will provide the subject matter for course, and 3) a team of faculty will be recruited as consultants in fields such as, Instructional Design, Curriculum Development and Assessment to ensure the instructional soundness of the course. This model can be used to make the job of creating a multimedia rich course easier and more effective.