The Impact of the World Wide Web on Teaching and Learning

Farrokh Mamaghani
St. John Fisher College

Follow this and additional works at: http://aisel.aisnet.org/amcis1998

Recommended Citation
http://aisel.aisnet.org/amcis1998/368
The Impact of the World Wide Web on Teaching and Learning

Farrokh Mamaghani
St. John Fisher College

Abstract

This paper is intended to examine the use of modern technology, into the acquisition and transfer of knowledge, using resources from the World Wide Web (WWW) in higher education. It will also serve to determine whether this new way of accessing knowledge is a beneficial tool in aiding students to a higher level of achievement, because they are more engaged in their learning activities. The Internet has the ability to remove all geographical and time barriers so that students can continue their learning long after leaving the classroom or graduation from the university. The WWW is now causing educators, from pre-school to graduate school, to rethink the very nature of teaching, learning, and schooling.

Introduction

Claims have been made that the WWW can free teaching and learning from the physical boundaries of classrooms and time restraints of class schedules. Traditional lectures and demonstrations can become WWW based multimedia learning experiences for students. Learning resources of the college and university can be augmented by learning resources of the world via WWW. Moreover, the WWW can help us re-focus our institutions from teaching to learning, from teacher to student.

Although there is some merit to these claims, it seems that we are expecting much from a tool developed only several years ago. In an address to Educom’s National Learning Infrastructure Initiative, Gordon Davis, Commissioner for Higher Education in Virginia suggested a framework for the analysis of present contributions to teaching and learning by the WWW (Davis, 1995). He stated that for technology to address the "major problems" of higher education it must respond to three questions: Does it make learning more accessible? Does it promote improved learning? Does it accomplish the above while containing, if not reducing, the costs of education?

Accessibility

Until recently, most colleges and universities have provided opportunities to students unable to attend campus for some time in the form of correspondence, traditional print instructional materials, and audio and video cassettes, or television. That is starting to change now as educators devise new ways to capitalize on WWW based technology. An attractive, graphical, interactive, multimedia learning materials with simplified access to many databases makes it a popular tool for teaching and learning. Furthermore, exponential growth of new resources around the world, and availability of technology that allow any brand of modern computer to access the WWW are some of the advantages institutions see in the WWW to make learning more accessible.

Although the WWW breaks down the long-standing physical and temporal barriers of access to education, it can create new kinds of barriers for students. These include computer hardware that malfunctions, difficulty in setting up software to access an educational institution or Internet service provider, and encountering constant busy signals when dialing up from outside. Once student gains access the problems are not over either. Heavy on-line traffic can overload popular Web sites so that they respond very slowly or simply do not respond. Also, annoying drops in telephone line connections occur all too frequently. Added to these technical problems is the cost of dialing up if the student is not within local calling distance, and the cost of using an Internet service provider when the institution cannot be accessed directly.

These new barriers can undermine an otherwise well designed on-line educational experience and lead to both student and instructor frustration. Providers of on-line educational programs must ensure that ample technical support is available for students, particularly in the early stages of the program when students are most likely to encounter many problems. At the same time they run the risk of disaster if their institution’s computing infrastructure (e.g., number of telephone lines, capacity of servers, and bandwidth of internal networks) is not adequate for the anticipated load.

Improved Learning

Do media influence learning? Perhaps the appropriate question is not do but will media influence learning. Educational technology is a design since (Simon, 1981, Glaser, 1976), not a natural science. The phenomena that we study are the products of our own conceptions and devices. If there is no relationship between media and learning it may be because we have not yet made one. If we do not understand the potential relationship between media and learning, quite likely one will not be made. And finally, if we preclude consideration of a relationship in our theory and research by conceptualizing media as “mere vehicles,” we are likely never to understand the potential for such a relationship.
We have come to understand that learning is not the receptive response to instruction’s “delivery.” Rather, learning is an active, constructive, cognitive, and social process by which the learner strategically manages available cognitive, physical, and social resources to create new knowledge. This will be accomplished by interacting with information in the environment and integrating it with information already stored in memory (Shuell, 1988). From this perspective, knowledge and learning are neither solely a property of the individual or of the environment. Rather, they are the reciprocal interaction between the learner’s cognitive resources and aspects of the external environment (Perkins, 1993).

Consequently, we will understand the potential for a relationship between media and learning when we consider it as an interaction between cognitive processes and characteristics of the environment, so mediated (Solomon, 1993).

There is promising indication that the WWW is a viable means to increase access to education. Evidence on how it can promote improved learning is not as forthcoming because the relationship has not been studied in detail. In fact, there is debate in the instructional design literature about whether there are any unique attributes of media that can promote improved learning (Clark, 1994). This debate stems from the observation that, after more than 50 years of research on instructional media, no consistent significant effects from any medium on learning have been demonstrated (Kozma, 1994). Educational television is a case in point. Initially, hopes were high that television would have certain characteristics that would lead to improved students learning, but none found (Kozma, 1991). Some argue that no effect can possibly be demonstrated, because improvement in learning, if any, will come from the instructional design, not the medium that delivers the instruction (Fetterman, 1996).

The WWW is still in its infancy. Yet, it shows much potential for becoming a major force in all aspects of our society. The growth of the WWW has been very rapid with the appearance of graphic browsers such as Netscape and Internet Explorer, which allow for point and click network-accessible information. This is what makes the WWW easy for anyone to browse, roam, and make contributions, as well as transferring of multimedia including sound and video. Many colleges and universities are moving into the WWW. What dynamics will play out is unclear as this system continues to grow. Perhaps the biggest question we need to think about is: How do we want it to grow and become a major contributor to our educational system?

One of the primary advantages of WWW use is that it appeals very much to the way our students now prefer to learn. Today, many students in public schools and in colleges and universities use the computer. They relate to the computer in ways that baffle adults. It is an integral part of their world. They play, are entertained by, and learn with the computer. They tend to be more visual learners than previous generations because their world is rich in visual stimuli. So it is in this environment that we design learning materials and opportunities that capitalize on what we know about how our students prefer to learn. The WWW is at the heart of many of these initiatives.

Costs

Web based teaching involves three types of costs: (i) hardware and software, (ii) course development, and (iii) on-going support and maintenance.

The hardware and software costs of a Web based course include the Internet connection itself and all necessary computer hardware and software to deliver a course. On a typical campus, these resources would be shared with other users in the same department, college, or across the entire campus. For a low enrollment course, the added costs for that one course would likely be relatively small, perhaps necessitating some minor hardware or software upgrades. However, as enrollment in the course increases, or if multiple Web based courses are added, the demands on the campus computing infrastructure could be enormous. First, campus networks may have to be significantly upgraded, second, high capacity dedicated servers installed, and third, many more modems and incoming telephone lines added to handle the volume of traffic created by students dialing up from outside. These costs could add up to significant amounts requiring additional budgets or forcing the institution to withdraw the Web based teaching from consideration.

Most college and university courses available on the WWW today are developed and offered by individual faculty members at their own initiative. Therefore, course development costs are often hidden, but nonetheless very real. Faculty who develop these courses spend great amounts of time above and beyond what they would spend on courses offered by traditional means. Not only they have to plan the academic content and pedagogy, they have to plan and develop the Web resources associated with the course. If WWW use on our campuses is to move beyond the domain of the motivated early adopters of the technology, incentives in the form of faculty training, technical support, honoraria, and professional recognition will have to be provided— all of which have costs associated. Institution will also have to consider establishing support centers to assist faculty with Web site development.

Once a WWW site for a course is operational, costs continue to accumulate as a WWW site is always a "work-in-process.” On-going support and maintenance are required, which include posting new materials and removing dated materials, verifying that links to other Web sites are still valid, improving the layout and design, and adding functionality. These tasks are considered essential for any good Web site. Added to this is a general expectation by the Web using community, that good sites incorporate the latest features of Web browsers (e.g., tables and forms) and exploit the latest Web technology (e.g., sound, video, Java applets, and other multimedia tools.)

It is difficult to quantify any of the above three categories of costs here. However, it is important to point out that all three represent expenditures above and beyond what an institution otherwise would incur. One effective strategy of minimizing the
impact of these costs is to concentrate Web development efforts and resources on the courses that generate the greatest enrollment.

**Conclusion**

This paper examined three aspects of a Web based education: Accessibility, Improved learning, and Costs. It was demonstrated that a promising case exists for the Web in all three areas. The case is rooted largely in how educators are actually using the Web today. Many of these uses are merely extensions of what is already being done with more established media. This is not surprising, because with any new technology, we tend to think it in terms of the frame of reference with which we are most familiar. Institutions should already be reexamining inflexible, outdated reward systems. The inflexibility of traditional universities, however, suggests that nontraditional educational suppliers may be best positioned to exploit the lucrative market for education in an electronic world.

**References**