DIFFERENT GENERATIONS FOR WEB-BASED TEACHING: A PUBLIC ADMINISTRATION PERSPECTIVE

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ABSTRACT

The commitment of prominent universities and professional schools to the development of electronic course material for the World Wide Web (WWW) has stimulated debate about the efficacy of the Web for promoting learning. Some argue that the unique properties of the WWW (connectivity, non-linearity, de-centering, and virtual presence) offer opportunities that a standard classroom could never match. Others contend that hypertext, including visual images, sounds, animations, and videos, merely creates an entertaining on-line distraction.

To help evaluate these competing claims, typical "cyberclasses" were reviewed. The results of the survey support the hypothesis that students in a typical "Webified" course (i.e., a course that has merely converted printed materials into Web documents with little or no interactivity) do not find these efforts as effective improvements in their educational experience. To stimulate student interest in the use of the WWW for course work, innovative applications of Web materials will have to be developed. Examples of such innovations include on-demand videos, links to audio archives, recorded interviews with scholars and policy officials, and live video conferences in the classroom. Furthermore, instructors will have to encourage their students to read, think, and write in hypertext.

INTRODUCTION

The explosion of computing power and the proliferation of electronic technology has brought the World Wide Web (WWW) into the classrooms of colleges, universities, and professional schools. The Harvard Business School, for example, has invested $11 million to organize and deliver information to its students through a Web-

based curriculum. Using the School's Research and Technology Laboratory, students work from the web sites that have been created for all of the School's more than 70 classes and organize their assignments, notes from professors, and links to other Web sites on their personalized home pages. Other business schools, such as Duke and the University of Michigan are offering M.B.A. courses on the WWW (*The Chronicle of Higher Education*, November 15, 1996, pp. A29-A31).

UCLA has embarked on a more ambitious project: the College of Arts and Sciences plans to offer a Web site to all of its (more than 3 000) non-tutorial courses. The College's Instructional Enhancement Initiative will be implemented by hiring 60 to 80 technology consultants, mostly students, and it will be funded by fees ranging from $10 to $14 per course. Although college administrators anticipate that the initiative will create an "exciting educational environment" and "unprecedented opportunities to enhance instruction," others, including professors, who wonder "if the Web pages are merely gimmicks," and students, who will have to pay more than $100 in additional fees, have expressed doubts about the project (*The Chronicle of Higher Education*, August 1, 1997, pp. A21-A22).

The commitment of the Harvard Business School, as well as UCLA and other educational institutions, to the development and maintenance of electronic course syllabi for the Web has brought a debate about the efficacy of information technology like the WWW for promoting learning to center stage. Educators, faced with tight budgets and multiple demands for resources, are beginning to ask hard questions about applications of the new computer technology: Is there a role for the Web in the classroom? If so, what is the most effective way to take advantage of the unique properties of the World Wide Web? Do mandatory electronic syllabi for every class help to enhance the learning of students? If so, is it worth the additional effort and cost?

THE DEBATE

While the unique properties of the World Wide Web offer a range of opportunities that a standard chalk and talk class could never match, questions about the educational value of this burgeoning medium loom large. Do the visual images, sounds, animations, and videos really add to the learning experience or does hypermedia merely provide an entertaining on-line distraction? Both sides of this debate are equally passionate and convinced of their positions. The enthusiasts believe it preposterous that such an exceptional and exciting technology could not provide educational benefits. The critics also argue that the WWW is just another gimmick being touted as the next revolutionary technology to transform teaching. Do you remember filmstrips? Do you remember educational television? Did any of us really take good notes and pay as close attention to these instructional aids as compared to when the teacher was lecturing or leading a discussion?

The World Wide Web, however, is quite different from a filmstrip. It offers a host of interactive possibilities that can be customized for the particular needs of nearly any course. It also carries with it some very different problems and obstacles. The debate over the value of computer technology in general, and of the World Wide Web more specifically, has changed relatively little over the past decade. Both sides have been making familiar claims and counterclaims while trying to amass definitive empirical data. So far neither side can claim victory, but a review of the major issues of this debate is instructive for evaluating the merits of using the World Wide Web in teaching now and in the future.

PRO-INFORMATION TECHNOLOGY CLAIMS

The claims in support of information technology in the classroom are bold (Hentrel and Harper 1985, 9). Perhaps one of the most commonly heard refrains is that the Web increases student motivation and makes learning fun (Bolton 1997, 7; Shechter, 1991, 9; Slonaker and Schmitt January 15, 1996). By using graphical representations to teach concepts, it also helps retain at-risk students and those with learning disabilities (Hentrel and Harper, 1985, 8; Taylor and Cunniff, 1988, 10). Another claim is that by having students use computers in their everyday schoolwork, they will learn important skills for the job market (Hentrel and Harper, 1985, 9; Noble, 1985, 64-65; Oppenheimer, July 1997). While estimates vary, many cite studies that the number of jobs requiring computer skills, or "knowledge workers" (Drucker, 1990), will continue to increase as a result of globalization and the development of the information economy.

Computers and the Web are also praised for promoting group work and co-operative learning in ways that would not occur in a standard lecture course (Kaye, 1989, 10; Slonaker and Schmitt, January 15, 1996). This allows the students to contribute more directly to the learning process, making the instructor a facilitator of knowledge rather than the sole repository of it. Similarly, interactivity is often promoted as a major benefit in maintaining student interest and as a catalyst for creative thinking and improved problem solving. By connecting students to other students, professors, and professionals around the globe, the Internet expands their horizons and brings a sense of real-world relevance to classroom (Oppenheimer, 1997). A recent study, considered to be the first to examine the "effect of online work on learning," show that students who used online materials did better work than those who did not. This research looked at fourth and sixth graders from seven cities in the United States (Mendels, October 26, 1996). While the claims made by technology proponents are ones that many users in the Computers and Multimedia Section have experienced, the critics' arguments in some cases directly contradict the claims of enthusiasts.

INFORMATION TECHNOLOGY CRITICS' CLAIMS

One of the biggest lightning rods for criticising efforts to use the World Wide Web in teaching is the issue of implementation. As more colleges and universities try to jump on the Internet bandwagon, the charge of inadequate prior planning and unclear, unfocused goals have been made by many critics. Lack of training or poor training are often cited as reasons for failure of technology integration projects as well (Mendels, July 17, 1997; Shechter, 1991, 12-15). How can one reasonably expect an instructor to utilize the benefits of the WWW if he/she has never been taught how to write HTML code, let alone the basic computer skills beyond word-processing necessary to navigate the Web?

Opponents of this technology claim that the relative dearth of good software and reliable information on the Internet detract from the learning process and in some cases lead to student papers that emphasize flash over substance (Bolton, 1997, 11; Mendels, July 17, 1997; Slonaker and Schmitt, January 15, 1996). Indeed some claim that much of the material on the Web are out-of-date summaries of summaries, leading to a decline of student papers that rely heavily on virtual sites (Rothenberg, *The Chronicle of Higher Education*, August 15, 1997).

The strain put on school budgets by computer and software purchases and their subsequent upgrades is also a major concern. Critics argue that these purchases mean that less money is spent on the basics of teaching, such as books, teachers' salaries, and even basic building maintenance. Moreover, many fear that the offers of free or reduced-price computers and software is a Trojan horse. Critics say that after this support disappears, the budget-devouring needs of upgrades and maintenance will create a crisis for administrators faced with the prospect of either funneling further resources into the black hole of technology, or losing on the investment entirely (Bolton, 1997, 9-10).

The most damaging evidence against use of the Web is a spate of studies that show little or no positive effect in the classroom (Mendels, July 17, 1997; Oppenheimer, 1997; Slonaker and Schmitt, January 15, 1996). These studies point to unimproved test scores and assignments, as well as teacher and student surveys that suggest the supposed benefits of this new technology are not being realized. In addition, some of the critics claim that the skills students do learn will be of no advantage to them in the future (Rothstein, July 7, 1997). This is a direct contradiction of other studies (some of which have been presented on APSA's Computer and Multimedia Section panels), which have shown there are benefits derived from using the Web (Boykin, *et al.* 1996; Ward, *et al.* 1996).

What conclusions can be drawn from this debate? Both sides can produce studies and evidence to support their research expectations. How can such radically different conclusions be drawn from studies that try to measure the same thing: does the WWW have a

measurable impact on the educational experience? One possibility is that not everyone is measuring the same phenomenon. Experiences differ greatly from class to class and from discipline to discipline. Some attempts, such as online simulations, are very elaborate, while others, such as online readings, are less ambitious. Because of the great range of applications of the World Wide Web in the classroom, no two studies are identical. Moreover, attempts to assess the impact of the Web are undermined by technical difficulties, changes in software, or the rotation of faculty members involved in the project. Perhaps the wrong instruments are being used to evaluate a relatively new technology. While the use of standardized tests continues, mostly out of a lack of a better option, they are still a relatively crude measure of performance and benefits (Oppenheimer, July 1997).

Another possibility is that most uses of the Web are not taking advantage of its capabilities. As was mentioned above, a hypermedia environment is much different from a book or handouts used in courses. It could be that in many cases the benefits of the Web are not being achieved, because we are still thinking in terms of traditional media. As Mason and Kaye point out, "information should be designed for a particular medium to best exploit its unique advantage" (1990, 16) So, to assess more accurately the value of the World Wide Web one should step back from specialized projects and try to identify the most common characteristics of a representative example of Web usage in teaching. This calls for an examination of the mode of the various applications of the World Wide Web in the classroom to date.

APPLICATION OF DIFFERENT GENERATIONS

Klass (1996) analyzed 41 Public Administration "cyberclasses," or courses with their own Web pages on the Internet. He found that the typical course site was a "digital resting place for a variety of course materials that could just as easily -sometimes more easily- be distributed to students in printed format" (1). Klass coded 53.7% of the sites as "first stage" cyberclasses, that is, they consisted of only a syllabus and hyperlinks to other web sites; 39.0% as "second stage" cyberclasses that included activities that were Internet dependent, such as interactive e-mail, computer assisted simulation, or role-playing exercises involving use of the Internet; and 7.3% as "third stage" offerings or virtual courses "without physical (or sometimes temporal) boundaries."

MAX 123--Critical Issues for the United States, a team-taught introductory course offered in the College of Arts and Sciences at Syracuse University, is a typical example of a second-stage cyberclass. This course site consists of a syllabus in hypertext with scanned images and many hyperlinks to the WWW for additional reading. In addition, there is an electronic discussion forum that students from each of the dozen or so sections access by entering their user ID and a password. The course site also includes two role-playing exercises that make use of the WWW. The students in Critical Issues were surveyed to learn more about the teaching effectiveness of Web-based undergraduate courses.

A more elaborate course site was developed by Gonick, who developed the Virtual Seminar in Global Political Economy. This site, which qualifies as a stage third-stage cyberclass, is an electronic dialogue among faculty members and students in different locations around the world. The seminar consists of, among other things, scheduled group sessions each week, led by a faculty member, a voluntary seminar café, and the opportunity to join collaborative writing teams to produce joint papers. The seminar is one of the few examples of courses that are not limited by time and space.

These three courses take advantage in varying degrees of the unique properties of the World Wide Web to promote learning inside and outside of the classroom. By virtue of the hyperlinks to the WWW that are provided by the instructors, all three of them encourage **connectivity**. Using the electronic syllabus as a starting point, students are able to explore the Web and connect with course material, a first step in the process of critical thinking. However, these courses, like most of the cyber courses that have been examined, contain little connectivity within their own boundaries. Little effort has been made by the instructors to integrate the material in one section of the course with that of the other sections. Students can, to a limited extent, explore a few connections within a typical electronic syllabus, but they quickly reach dead ends. Although students can read the papers written by other students, hyperlinks between student papers have not been provided, even among papers written on the same topic.

These cyber courses also achieve **non-linearity** through the networks of nodes and links on the WWW, but also lack this property within the course sites, themselves. The electronic syllabi provided to students for these courses, and most of the other courses reviewed, resemble the typical paper document, with the addition of hyperlinks to the Web and a few images. The courses look very linear and this structure is reflected in the course sites, themselves.

Given the linear structure of these course sites, it is difficult for students to take advantage of another property of the WWW, **de-centering** or the continual shifting of the reader's focus that begins to break down the distinction between the author and the reader. Since both faculty members and students exist in cyberspace and have almost the same access to the seminar, distinctions between authors (instructors) and readers (students) are more difficult to sustain, and, as a consequence, de-centering is easier to achieve and maintain.

EFFECTIVENESS

From this review, it appears that the majority of the applications of the World Wide Web in Public Administration are modest endeavours that merely "Webify" printed materials. By "Webify," is meant the conversion of printed materials, such as syllabi, hand-outs, and readings, into basic HTML documents with little interactivity or other features, which the World Wide Web is capable of supporting. It could be stated that students

do not view these "Webified" efforts as effective improvements to the learning experience. Accordingly, the hypothesis was that **students do not view "Webified" course materials as enhancing their learning experience** by surveying students in a typical "stage two" under-graduate course: *Critical Issues for the United States.* The results support the hypothesis. Of the students who responded to the survey, most did not visit the course site even once a week during the semester. Only eleven out of 103 students visited the course site more than ten times. The other 92 students visited the course site 0-10 times, with the majority of the total student sample (66%) visiting 1-5 times during the semester.

To achieve a better understanding of what motivated the students to access the course site, students have been asked if they used the site to explore course-related issues. Of the 98 out of 112 students who responded to the question, 49% said they used the course site to explore course related materials while 51% said they did not.

Perhaps even more revealing of what students think of the standard course site were the responses of the students who said they did use the Web site to explore course related ideas. Of the 46 students who answered both questions, only 17,4% of them visited the website more than 10 times during the semester, while the other 82,6% visited the site 1-10 times. None of those students claimed to have never visited the course site.

In light of the low number of reported course site visits, it is not surprising that only three of the students cited materials related to the WWW, or the course site specifically, as something that could have made the learning experience of the course more valuable.

Why is it that despite the efforts of the faculty members to develop a useful course site, their students do not appear interested in taking advantage of it? One reason is that most, but not all, of the material on the site were also made available as hand-outs. Another explanation could be that nearly all the information on the Web site was prepared in advance and made available at the beginning of the semester, instead of having regular updates requiring the students to check the course site more often. A third possibility is that the course site, while the product of hard work and dedication, was not innovative enough to attract the students' attention. It was the product of a typical "Webification" of standard course materials, rather than an interactive "cyber experience." In this case, the course site did not expand the classroom significantly. The different generations of web-based teach-ing and learning are also referred to as the levels of learning. In this regard Fresen *et al.* (University of Pretoria) supply a handy taxonomy of uses of the internet for learning.

TAXONOMY OF USES OF THE INTERNET FOR LEARNING

The taxonomy of uses of the Internet for learning are divided into seven levels. The mere awareness of these levels should sensitise web-based instructors in Public Administration about the possibilities of web-based teaching and learning.

Level 1 - Key-pals, e-mail, mentorship

Students or pupils can communicate with other schools, both locally and international-ly. This can contribute to language studies, in that students of foreign languages can com-municate with mother-tongue speakers and gain meaningful practice. Although Public Administration is culture-bound it could also benefit from international exposure of all countries involved.

Arthur Goldstuck refers to Jacques Leslie who claims that electronic mail (e-mail) returns the efficiency of the London postal service of the mid-19th century - when postal deli-veries occurred every hour for 12 hours a day. "It's taken more than a century for tech-nology to catch up, and finally race ahead" (Arthur Goldstuck, 1995, Hitchhiker's Guide to the Internet, p.11).

Poling classifies his classroom use of e-mail as the following activities: student questions, counseling, class assignments, general class announcements, occasional quizzes, direct communication to a particular student and posting grades. He reports that his experience in using e-mail as a teaching supplement has been overwhelmingly positive and effective.

Level 2 - BBS and Newsgroups

BBS's (Bulletin Board Systems) are electronic meeting places for announcements, debates, discussions and software exchange. They offer the cheapest access to the I-Way (Information Highway).

The advantages of BBS's are the number of shareware or public domain programmes available that can be downloaded free of charge. This is the most basic service offered by most BBS's. They collect public domain software off the Internet and make it avail-able for downloading to users without giving them access to the Net itself.

Other BBS's offer increasing levels of Net access, such as acting as interfaces between the user and UNIX, providing a menu of commands the user needs never memorise, accessing USENET news. The user is not directly connected to the Internet, but it will seem as if he/she once latched on to a few favourite newsgroups.

Interlink, the service provider on BelTel, provides a service on a par with Internet con-nections through BBS's and offers options that are categorised as Chatting Services, Online Games, Information Services and NASA Related Services.

The cost of BBS's is usually very low, sometimes even free. This is a good start for the ordinary, low-tech I-way explorer. (Adapted from Hitchhiker's Guide to the Internet, Arthur Goldstuck.) Often the first introduction to computer mediated communication

(CMC) is through a bulletin board. The technical requirements to make such "links" are relatively unsophisticated; even the oldest and slowest modems can be used, though the down-loading of files could be expected to be a rather tedious and not very cost-effective process. Most BBS software remains DOS-based, although much has been adapted to be accessed through the Windows platform.

All BBS's require a person to register by providing a number of personal details to the "SysOp" or System Operator, who will then register the user's password and, depending upon the BBS await a registration or membership fee before activating that user's "account".

However, many BBS's are accessed by particular interest groups, and although users are allocated passwords, membership is free, eg. Christian Network BBS. Signing up with an internet service provider may also allow one free access to associated BBS's eg. PiX subscribers have free access to the Digitec Online BBS.

The primary advantages of using BBS's lie in the easy access to useful utility files, documents discussing issues one may find relevant in particular subject areas, and the ability to enter "CHAT" sessions (on-line screen text conversations) with whoever may be online at that time, or with particular people by prior arrangement. One may also join "conferences" i.e. discussion fora on an on-going basis, providing comment as one feels one has something to offer.

This writer's observation of an incident involving a student using this "CHAT" facility may demonstrate its educational potential: The student, having some difficulty with the construction of an HTML document for the School's WWW page, logged on to the BBS to which he is registered through his internet service provider. He entered the "CHAT" mode and threw out a plea for help into cyberspace. Within minutes other users were supplying answers to his query.

The learning potential from BBS access is great even when the focus of a particular BBS is rather narrow. Rather like the special reference shelf or a collection of thematic references in a library.

One point to be made concerning the usefulness of BBS's in down-loading files, particularly large ones: they are fast! Generally when the "web strands" or the internet are very busy, the rate at which data is received is very slow no matter how fast one's modem is, "like driving a Ferrari on the highway during peak traffic" (Goldstuck, A. (1995). Slow is slow!

BBS downloads are very fast since a direct modem to modem link is in place, and providing the service supplier has a fast modem and Telkom's line is free of interference data arrives very efficiently.

There are over 3000 newsgroups on the Internet ranging in topics from government sites to childsupport to nintendo-addicts to pollution to hyper channel to hardware networking to travel to media. There is something for almost every interest. Material is posted from any site and received by anyone reading the group. Selection of suitable newsgroups is necessary for educational purposes, as well as a watchful eye for undesirable behaviour.

Level 3 - Mailing lists and list servers

There are many mailing lists concerned with educational matters on the Internet. Once the user has subscribed, the user automatically gets all the mail posted to that list. On first getting e-mail access one is very enthusiastic and join many lists, and may subsequently drowns in the mail. It is better to select a few mailing lists with care.

The user should decide what he/she wants to learn when selecting a list. It should be noted that the telephone lines will be busy unloading your mail for periods of time, some of them lengthy.

The mailing list Kidsphere deals with educational matters, has details of projects, has requests for greetings, pupils post surveys to the list and enter into general educational discussion. It is an international mailing list with an American flavour. The mailing list Ednet deals with educational matters and the Internet. It is also an international mailing list with an American flavour. Another mailing list of interest, particularly to South Africans is the Schoolza list. Stephen Marquard posts a list of all the schools in South Africa with access to e-mail to the list, and there is discussion about education and the Internet in South Africa.

The major professional associations in Public Administration in the USA have all got mailing lists. Maybe, a mailing list should be considered for the South African Association of Public Administration and Management.

Level 4 - World Wide Web

The World Wide Web (WWW) has become almost synonymous with the Internet. A product first unveiled in 1990 and made available for public use in 1993, this tool for research scientists to communicate globally, was originally developed in Geneva, Switzerland, at the European Centre for Nuclear Research (CERN). So-called web browsers such as Netscape Navigator and Internet Explorer, are required to access the web.

Bearing no relation to top-down menu-driven information services, the essence of the "web" is that one begins at a particular information root, (URL or Uniform Resource

Locator, which is an "address" with a very specific identifying format beginning: http://www. ....), then follow any one of innumerable branches until the information file one seeks is located. A network of interconnecting hypertext links allows one's browser to access information from sites all over the world on a particular subject. Arthur Goldstuck(1995, p. 96) calls the WWW the "N1 of the information superhighway system".

Level 5 - Internet Relay Chat

Until recently, live Internet communication was confined largely to the transfer of text and graphics to provide the aura of a multimedia wonderland. The next level that has now been added to the taxonomy is Internet Relay Chat. Internet Relay Chat (IRC) makes it possible to log in to any IRC server in the world and join live chat channels with any number of individuals typing in their conversations on a particular topic. Serious conference calls are possible, but rare. If a user has friends, relatives or associates with Internet access in another country, he/she can arrange to link to the same IRC server at the same time and have long chats for the cost of a local call. IRC software is required in addition to the normal Internet software. (Adapted from *Hitchhiker's Guide to the Internet*, Arthur Goldstuck).

Level 6 - Internet Phone

Internet Phone (Iphone) is a new programme that was released on the Internet and on electronic bulletin boards worldwide on 12 February 1995. Iphone enables the user to speak to anyone anywhere in the world, at the cost of a local call, as long as both are connected via PC and modem to a local internet service provider.

If the user is connected to the World Wide Web via a SLIP account, he/she can download a file called Iphone25.exe, put it in to the same directory as the user's Internet software, double click on the filename in Windows Program Manager, and an icon will appear, showing the globe with a phone attached. On double clicking the icon, the system goes via the internet service provider to an on-screen approximation of a telephone switchboard. There are still problems with level of hardware required, poor line quality worldwide, and having to arrange for people to dial into the same IRC site at the same time.

Level 7 - CU-SeeMe

An exciting CMC product creates a one-to-one connection, or by use of a reflector, a one-to-many, several-to-several, or a several-to-many video conference depending on user needs and hardware capabilities. The hardware required is expensive at present, but

will doubtless reduce in cost with time. But essentially, anyone with a fast modem, a video camera linked through a video capture card, and a microphone linked to a normal sound card, is enabled to communicate audio-visually with anyone else similarly equipped.

CONCLUSION

Gizzi (1997), observes that although course sites can enhance the traditional course by providing links to Web resources, an annotated hypertext syllabus, course readings, archives of lecture notes, and student presentations, "instructors have barely begun to scratch the surface of potential uses for the World Wide Web in Public Administration". Gizzi also goes on to explore what he calls the "second-generation" of course sites--"those that seek to make more innovative use of the Web". Here are a few examples of how the second generation of course sites might take better advantage of the opportunities offered by the WWW:

Instructors can videotape classroom simulations and make video clips for students to access from the Web for further analysis and critique (see excerpts from a airline hijacking simulation). Courses in Constitutional Law can link to Oyez, an extensive archive of oral arguments before the USA Supreme Court, supplemented by background material and written opinions that Goldman has developed. Others can create similar archives for other fields of Public Administration. For example, Kreisler has posted transcripts of taped interviews with "men and women who have made a difference" in history, and he has begun to provide videos of these interviews on demand through the WWW ("Conversations with History"). The John F. Kennedy School of Government carries talks by high level policy officials live over the Web, maintains an audio archive of previous talks, and makes available transcripts in a series called, "Live from the Forum". Many other applications that may serve as prototypes are available through the USA National Demonstration Laboratory, which has an archive of over 200 multimedia applications, mostly on CDs, CD-ROMs, or Videodiscs.

In addition to these opportunities, advances in video-conferencing technology have made it possible to conduct point to point or multi-point video-conferencing for learning (see level 7) over relatively inexpensive ISDN lines to enrich the classroom. It is feasible for an academic specialist or policy official in one physical location to have a fully interactive video-conference with a classroom of students in another place. The conference can be archived, providing a resource for other students to access on the WWW. Desktop video-conferencing over the Internet, which can be done using inexpensive cameras and software, provides the opportunity for students who are in remote locations to stay in contact with their colleges and universities. For example, a student doing an internship or research project abroad could use a desk top video-conferencing system to consult with a faculty advisor and exchange computer files.

In the long run other potential uses of the World Wide Web, beyond the second generation of course sites, may have a significant impact on the both instructors and students in Public Administration. To realize the full benefits of this new computer technology, Public Administration education will have to be reconfigured for the 21st century. Instructors will have to help students to think in hypertext by encouraging them to do non-sequential reading and begin to make the connections among diverse kinds of materials, from the abstract academic to the everyday world of political activity. Instructors will encourage their students to write in hypertext and create their own documents in hypermedia that integrate the subject matter of the course. To take full advantage of the Web, instructors will promote collaboration; not only within their classes, but also with others outside of their classroom who have similar interests. The result will be the beginning of a global collaboration for learning.

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