Wolfe, C. R., Crider, C., Mayer, L., McBride, M., Sherman, R., & Vogel, R. (1998). Toward a Miami University model for Internet-intensive higher education. *Journal on Excellence in College Teaching, 9* (1), 29-51.

Toward a Miami University Model for Internet-Intensive Higher Education

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The authors present four cornerstones of an emerging model for Internet-intensive undergraduate education: that students learn from creating online materials themselves, that faculty facilitate active learning, that intellectual exchanges among students are enriched, and that the sensibility of the seminar is extended. The authors then explore the model through four applications: a large environmental geology lecture course in which the Internet increases student involvement, an economics course in which the Internet elucidates abstract materials and promotes cooperative learning, a social psychology course in which the Internet supports the application of principles and curriculum integration, and a journalism course in which the Internet provides for an authentic journalistic experience.

The proliferation of the Internet seems to have given rise to extreme claims about the future of higher education. The last five years have witnessed many predictions of how the World Wide Web is poised to transform teaching and learning (Spicer, 1995). In his provocative 1998 presidential address to the Society for Computers in Psychology, Eamon reviewed the popular literature and presented a continuum of positions on the Internet's likely impact on the academy. These positions range from *management technophile* to *teacher advocate*. Some argue that today's universities will be replaced by "virtual universities," such as the University of Phoenix, which currently enrolls over 50,000 students (Leatherman, 1998). They note that "more than half of U.S. colleges and universities offered distance education courses in 1995, and that number is surely larger now" (Eamon, in press). Technophiles, such as Perelman

nd Prowse, argue that even virtual universities are doomed to failure. 'erelman argues that these virtual universities are mistakenly attempting to replicate the traditional university on-line. Prowse prognosticates hat, in the future, companies will hire employees in their mid teens and rain them on-line on a "just-in-time" or "need-to-know" basis (Eamon, n press). Thus, Perelman (1997) argues, "education is in a 'metastable' ituation and will come to a 'systems break' within years, or even months" quoted in Eamon, in press).

Teacher Advocates, such as Neal and Wilson, flatly deny the dire predictions of the technophiles (Eamon, in press). Others, described as *noderates*, have argued that information technology may weaken the traditional university. Yet unlike those at the extreme technophile end of the continuum, moderates such as Noam appreciate the university and see opportunities for positive change. They believe that universities have the potential to adapt, become transformed, and thrive in the information age. As Noam states,

> True teaching and learning are about more than information and its transmission. Education is based on mentoring, internalization, identification, role modeling, guidance, socialization, interaction, and group activity. In these processes, physical proximity plays an important role. Thus, the strength of the future university lies less in pure information and more in college as a community; less in wholesale lecture, and more in individual tutorial. . . . Technology would augment, not substitute, and provide new tools for strengthening community on campus. (quoted in Eamon, in press)

Sorely lacking from many of these discussions are models of transformative adaptation and specific insights into how instructors might best use the Internet to effect positive change in teaching (Polyson, Saltzberg, & Godwin-Jones, 1996). We are not prepared to join the fracas in predicting the future of higher education. However, we are well positioned to describe specific examples of using the Internet to enhance instructional effectiveness in light of an emerging model for Internet-intensive higher education.

The organizational context is often overlooked in discussions of the Internet and higher education. Yet organizational factors such as learning culture, learning supports, teaching supports, and incentives have demonstrable effects on learning and instruction (Tessmer & Richey, 1997). As an organizational context, our campus represents an interesting case. In many ways, Miami University is the quintessential traditional university. Chartered in 1809 and located in the college town of Oxford,

Ohio, Miami is the second oldest, and arguably the most prestigious, of the state-assisted universities of Ohio. Although we do not always live up to this designation, Miami has been described as a "Public Ivy" (Moll, 1985). Miami's traditions, residential character, and rural location are powerful factors in maintaining a relatively traditional student body and campus life. Miami is a place where young people "go away to college." However, demographic trends are working against this kind of institution as the nation's student body becomes older and attempts to balance college with work and family. In short, if the technophiles, or even the moderates, are to be believed, Miami is just the sort of institution that is destined to fail—perhaps in a relatively short time.

We contend that a model for Internet-intensive education is beginning to emerge at Miami University—one that strengthens community in much the same way as envisioned by Noam. We propose four cornerstones of this emerging Miami University Model:

- Helping students create online materials themselves provides the context for powerful learning experiences. Thus, students learn by working collaboratively and acting as cognitive apprentices to produce Web sites and other "new media."
- The Internet can help faculty become facilitators of active learning. Faculty can use technology to transform their roles from transmitters of information to guides and mentors, both on-line and in person.
- Online interactions can strengthen community and enrich intellectual exchanges among students. The Internet can be used to create rich "feedback webs" among faculty, students, and others beyond the confines of campus.
- Abstract concepts, concrete problems, and relevant experiences can be discussed and critiqued on-line in a constructive environment free from the limitations of time, space, and scheduling. Thus, the Internet can extend the sensibility of the seminar discussion.

Like all models, this is a simplified representation of a complex system. Its purpose is to elucidate underlying similarities in practice and perspective in order to facilitate communication and understanding. The model also is useful to the extent that it helps readers to think about the

ıle of technology in their own institutional contexts and to distinguish ɜtween the practices of traditional institutions like ours and those of irtual universities and proposed "just-in-time" information services.

Below we present four examples of the use of the Internet in courses Miami University. Each of the four cases was supported by Miami's ɜarning Technology Enrichment Program, with the assistance of the ɔirector of Faculty Development in Learning Technology. The nature of ıese diverse instructional contexts illustrates how one or more corner-tones of the Miami University Model can be used to enhance learning. one of the cases employs all of the elements of the model, nor do we elieve it should. The model is embryonic and developing organically.

The first application of the model we present is in a large geology ɜcture course taught by Mayer, who is using the Internet to increase ctive student involvement in multiple learning experiences within an ıstructional context that often limits such opportunities. The second pplication is in an economics class taught by McBride, who is using the ıternet as a tool to reify abstract concepts (Papert, 1984), thereby pro-ıoting experiential learning in a domain that inherently transcends ɜeryday experience. The third application is in an upper-level psychol-gy course taught by Sherman, who is using the Internet to integrate the urriculum between upper- and lower-level courses. The fourth applica-ion is in a journalism course taught by Crider, who is providing students vith opportunities for authentic journalism by having the Internet serve s both the medium and the focus of study—or, to borrow McLuhan's 1964) famous phrase, "the medium is the message."

Application of the Internet in a Large Geology Lecture Course

Larry Mayer

Environmental Geology is an introductory-level geology course at Miami University covering the broad subject of how active geological systems interact to create both natural resources and natural hazards for people. More than 60% of the students enrolled in the course are in their first year at Miami. The ratio of female-to-male students varies from about 60:40 to 70:30. Class size generally has been limited to 90 students. The overwhelming majority of students, up to 95%, register for the class to satisfy a university requirement rather than to satisfy their own curiosi-ty or interest. For a large lecture class such as this, where the potential for interaction between faculty and students, measured by in-class or

out-of-class contact time, is less than for smaller classes, the strategies for teaching require thoughtful curriculum design (or incredible natural talent as an educator). I have found that Web technology can play a useful role in providing for increased interaction and feedback between faculty and students to promote mutual learning.

Course Goals

The goals of Environmental Geology are to provide students with a basic understanding of geological science and earth systems, to develop an appreciation for the interconnectedness of natural systems, to develop and/or enhance critical reasoning skills using geologic information, to promote creativity and discovery, and to develop an understanding of the role the individual plays in defining society's interaction with the environment.

Learning by Creating Web Sites

It is generally very difficult to encourage student collaboration in large lecture classes. Students often perceive that such collaborations are forced structures that have no organic root in the class. Collaborative efforts are therefore often dominated by the group leaders, and participation by others is more formal than real. Two means I have developed for encouraging real interaction among groups are an electronic Chat channel and a Web-based newsletter.

Communicating with a Chat channel. The purpose of the Chat channel is to enable students to interact electronically regarding Environmental Geology with their classmates, or even with their parents and friends, from dorm rooms, computer labs, or elsewhere. Chat channels include the study channel, for studying on-line in groups, and the guest speaker channel, where a guest from another university can participate in an online discussion with students. The Chat option is not popular with most students, who apparently prefer not to invest out-of-class time chatting on-line about the course.

Creating a Web site. A more popular means that I have developed to foster collaboration is an electronic newsletter, *Environmental Focus*, which requires students in the Environmental Geology course to act as researchers, writers, editors, and copy editors in order to determine important events in environmental geology and explain these to their student peers. As evidenced by the large number of e-mail responses to articles, many people—both students and professionals—read the newsletter.

Enriching Intellectual Exchanges

There are two primary ways that the Web can be used to help enrich intellectual exchanges: by enhancing comprehension and scientific reasoning and by providing several layers of direct feedback between students and instructor.

Enhancing comprehension and scientific reasoning. Environmental Geology seeks to provide students with information about the physical world as well as insights as to why that information is important and how it was discovered. The importance of a topic in Environmental Geology could be taught as a simple fact, for example, "Plate Tectonics is important." However, that style of teaching runs counter to the actual methods of reasoning in science. The importance of a topic is better taught by pointing to how the discovery of another fact is related to that topic. For example, students can explore how Plate Tectonics explains many different geologic phenomena and thus come to understand its role as a paradigm. Through various means, such as hypertext or multimedia presentation, instructors may use the Web to make these connections apparent for students.

Reasoning and discovery in geology often are based on the visualization of complex processes through time. Multimedia delivery of information on the Web provides ways to assist students with visualizing complex phenomena and using this power of visualization to reason. For example, I have asked students such questions as "Why are there 600 million year old glacial deposits in Death Valley?" and "Which is older, the Atlantic Ocean or North America?" I have never taught these facts in class, nor are they in the students' textbooks. Yet I expect students to be able to reason the answers to these questions by visualizing the process of Plate Tectonics. The ability to watch a Plate Tectonic animation illustrating this process on the Web helps immeasurably.

The Web also excels at helping students learn to interpret information in graphic form through "smart graphs." A smart graph uses animation on-line to illustrate to students how to interpret it. Rather than having to repeat the same information for the entire class, an instructor can use the smart graph to augment his or her explanation for those students who desire more information.

Providing feedback to students. The model for feedback we sometimes use in academia often would seem absurd in the business world because, in many cases, we provide a service without having obtained sufficient feedback or background information about the users of the service. We teach the same material in the same ways, even though each class is different due to the different backgrounds of the individual students and the "chemistry" of each class. During a semester, faculty can and should make pedagogic adjustments to respond to student needs. Similarly, students need to make adjustments in their study habits to adjust to the class.

In most courses, the sharing of feedback between students and instructor occurs primarily through evaluative instruments, such as homework and examinations. Given that these evaluative instruments are in place, the Web can be used to provide students with truly useful evaluations of their performance in a course *before* they receive a final grade, when it is too late to make adjustments. In a small class, the instructor normally could provide such feedback directly to students. In large classes, however, more efficient methods for giving feedback are needed. Tracking student performance on exams and then providing this information to a large class can be accomplished using a database that is connected to the Web. For my Environmental Geology course, for example, students may, at any time, check to see their records using the Web. Each student record provides information on a student's examinations, take-home exercises, and the instructor's comments on their work. One measure of the utility of this service to students is the number of times they actually check their records: Each student in the course checked his or her record an average of eight times during the course.

Providing feedback to faculty. Instructors commonly ask for students to evaluate their performance at the end of a term, and these evaluations generally are used for administrative decisions such as promotion and tenure. In order for an instructor to optimize his or her performance (and each particular student's educational experience) during a course, however, such feedback comes too late.

I have found the Web to be useful for this purpose. I provide my students with an anonymous feedback form from the course Web page that they can fill out after each week of classes, evaluating my performance based on criteria that I select. The data from each form are automatically updated weekly by a script program, and both students and I can see the results as they are tallied. With such a system, an instructor can use the evaluations each week to improve his or her overall performance.

E-mail also provides an important means for soliciting student feedback. Students may e-mail me from a link on the course Web page, and there is a weekly reminder on each assignment page that e-mail is a good way to communicate with me. The system is working. For each class I teach each semester, I receive about 300 e-mail messages from students. These messages include questions, comments, or suggestions and are quite useful for improving my performance.

Through collaborative work, continuous feedback, and an array of ıpporting materials, the Internet has enabled me to provide a rich set f tools for enhancing intellectual exchanges among students and ex-ıding the best qualities of a smaller seminar to a large lecture class. Used judiciously, these tools can promote scientific reasoning, critical ıinking, discovery-oriented learning, and the ability to apply geologic ıformation to understand the interaction between society and the envi-ɔnment.

Using Technology in Teaching Abstract Economic Concepts

Mark McBride

The traditional approach of teaching abstract economics principles to tudents and then having them apply those principles to the study of conomic behavior in a variety of contexts can be problematic. Although naking technology an integral part of the teaching approach in econom-s courses can help students apply what they learn, it also raises many uestions. The goals of the course, in terms of both the content to be earned and the approaches to learning to be supported, dominate any liscussion. This section describes the issues raised for me in attempting o integrate technology into a Principles of Microeconomics course at Miami University.

Course Goals

Siegfried et al. (1991) define the goal of economics instruction as "En-ıbling students to develop a capacity to 'think like an economist. . . .' Thinking like an economist involves using chains of deductive reason-ng in conjunction with simplified models . . . to illuminate economic ɔhenomena . . . " (p. 21). Saunders (1998) identifies four major objectives or a course in economics: a knowledge of basic terms, an understanding ɔf basic economic concepts and principles, the ability to apply economic ɔrinciples to new situations, and the ability to interpret economic data. Laurillard (1993) argues that university education represents a second-ɔrder learning that goes beyond everyday experience. Academics want ıtudents to learn more than is possible through direct experience (that s, to think like an economist). Academicians create a conception of the world, and the classroom should create an environment that allows stu-dents to experience this conception. Thus, academic education is a form ɔf mediated learning.

Facilitating Active Learning

Developing a teaching strategy based on academic goals and objectives for learning involves integrating the elements of learning theories, learning styles, and learning technologies. Many studies across various disciplines, including economics, have argued for creating active learning environments for students. Lage, Platt, and Treglia (1998) argue for inverting the economics classroom by offering videotaped lectures outside of class and support materials via the Internet, then focusing on active-learning exercises such as in-class experiments during class.

My teaching strategy for the Principles of Microeconomics course was to create and implement an active learning environment. Thus, I began by substantially reducing the amount of lecture. Then, in order to address the goal that students learn to "think like an economist," covering most topic areas required a three-day cycle. In the first class period, students participated in a market experiment. The experiment both helped to create an environment in which students could experience an economist's conception of the world and generated data for a lab report, which was to be completed by the second class period. During this second class period, students engaged in active and cooperative learning activities based on the lab reports to discover general microeconomics concepts and principles. In the third class period, students used cooperative groups and/or the discussion of newspaper articles dealing with economics issues to apply the general principles they had learned to a new context. My overall strategy for the three-class sequence was to foster mediated learning. Once I had developed a teaching strategy, the next challenge was determining how to use technology, if at all, to complement and enhance the teaching strategy.

Enriching Intellectual Exchanges

Internet technologies are a form of Computer-Mediated Communication (CMC). Harasim (1989) provides a summary of the differences between CMC and face-to-face communication. Whereas CMC can be time- and place-*independent*, mediated, and interactive (many-to-many), face-to-face communication is time- and place-*dependent*, mediated, and non-interactive (one-to-many). Since Harasim's work 10 years ago, the expansion of Internet services has led to CMC being both a one-to-many and a many-to-many form of communication. Depending on the teaching strategy, using CMC via the Internet can offer pragmatic advantages. For example, the Internet allows for the creation of a consolidated repos-

tory of information, the time-sensitive release of information in a one-o-many setting, the use of many-to-many time-independent interactions, nd the creation of additional mediated environments for learning. Furhermore, it is easy to modify information under changing conditions to reate a more dynamic environment for learning.

The Web site I created in the Principles of Microeconomics course to upport the teaching strategy described above takes advantage of sever-l of the features of CMC. First, all standard course materials were made vailable to students on-line, in many cases before the next class. Sec-nd, many new types of materials (for instance, links to online articles) vere added. Third, the lecture portion of the course was provided by nultimedia lectures, with graphics and voice overlays served via links rom the Web pages.

The use of online lectures allows students to experience the lecture at time and in a place of their choosing. It also frees classroom time to ocus on creating a mediated environment to foster active learning and n inverting the classroom in the manner described by Lage et al. (1998). he class implemented the many-to-many nature of CMC by using dis-ussion boards on the Web to allow for follow-up on in-class active earning experiences. The discussion boards allowed students to reflect n the in-class activities and engage in further discussion about them. inally, we used the course Web site to create the mediated environment or student learning. Students conducted some experiments on-line pri-r to class and used the data generated by the experiments for active earning experiences during class. Thus, using the Web to deliver mate-ials normally given in lectures, provide supplemental materials in a ime-critical fashion, and enable online experiments outside of class plays pivotal role in consolidating the three-day teaching cycle of participat-ng in market experiments, analyzing and reporting data, and applying oncepts in a novel context.

The implementation of Internet technology into my Principles of Mi-roeconomics course has evolved slowly over the past four years. Using he Internet to convey information previously taught in lectures creates he opportunity to shift my role as instructor from lecturer to facilitator f experiential learning. The Internet also helps provide the benefits of a eminar discussion that is free from the constraints of time and space, articularly when applying abstract principles to new contexts such as hose presented by newspaper articles. The approach I have described mploys the Internet as a complementary tool to bring about a change in ourse focus, create a mediated learning environment, and increase the se of active learning.

Integrating Introductory and Advanced Social Psychology Courses

Richard Sherman

Introducing new learning technologies into college courses can produce two kinds of effects (Kiesler, 1997). First, technological innovations may *amplify* certain capabilities, functions, or processes that already exist. For example, the Internet and the Web can greatly increase the amount and diversity of information that is available to students. Second, technological innovations also may *transform* the way students and faculty function and interact, thus producing fundamental changes in their roles and relationships. For example, computer-based learning technologies frequently have been used in ways that alter the traditional roles of student and teacher by shifting the focus from instructor-centered to student-centered activities (Collins, 1991; Locatis & Weisberg, 1997; Menges, 1994; Reinhardt, 1995). In the project I describe below, Internet technology transforms student roles in a fundamental way: Students become the primary agents in the production and integration of curriculum content across introductory and advanced psychology courses.

Course Goals

Learning by Creating Web Sites

The basic premise of this project is quite simple: Teams of students in advanced psychology courses create Web-based educational experiences for students in lower-level courses. As part of this process, the advanced students design ways to assess the impact of their educational modules; then they receive feedback on their work from students in the lower-level courses. Although the overall concept of this activity is simple, the pedagogical implications are multifaceted and complex in terms of how they transform student and instructor roles. For example, the roles of both the advanced- and introductory-level students shift from recipient-consumers of information to producer-participants in the generation of new knowledge. The role of the instructor changes from controller and transmitter of information to guide or coach—one who facilitates or assists students in sampling, interpreting, and communicating material.

The idea of involving undergraduates in curriculum integration has grown out of my earlier experiences with Web-based instruction in advanced courses (Sherman, 1998). The students in these courses produced a number of educational modules that reside permanently on the Web

<http://miavx1.muohio.edu/~psybersite/> and therefore still can be accessed by other students both at Miami University and around the world. To illustrate the nature of these projects and the ways in which they transform student roles, I will describe a recent course in Advanced Social Psychology that I taught at Miami.

Students' Web activities in the Advanced Social Psychology course entail, to varying degrees, collaboration and knowledge sharing, direct experience with information in various formats, and manipulation of information into new forms. In all of these projects, students produce Web materials that are intended to inform and educate students in other courses as well as those in the Advanced Social Psychology course. The activities include a Social Psychology and Humor Project, a Social Psychology in the News Project, and a Web Tutorial Project on a social psychology topic.

Humor Project. For the Humor Project, teams of students select a cartoon that they find humorous and relevant to social psychological principles, lead a class discussion of the cartoon, and produce a written analysis that is published on the course Web site.[1] Humor can provide an interesting and entertaining introduction to a topic and serve as a convenient and memorable reference for subsequent discussions. Instructors frequently attempt to illustrate principles and concepts through cartoons or other humorous material. However, materials that seem humorous to instructors do not necessarily produce the same reaction among students. Having students select cartoons themselves solves this problem while transforming their role from passive recipients to active producers of information. Students can describe the relevance of their selected cartoon in terms of how it illustrates some concept, theory, or line of inquiry in social psychology, or in terms of how certain social psychological concepts or principles are useful in understanding the emotional or intellectual impact of the cartoon.

News Analysis Project. The News Analysis Project requires teams of students to select a current news event and analyze it from a social psychological point of view. Team members meet outside of class to evaluate possible topics, lead an in-class discussion of their selection, and produce a written analysis, which is posted on the course Web site. Prior to the class discussion, the team posts a preliminary analysis of the topic on the Web for others in the class to examine. Students are encouraged to exploit the availability of online news sources and other reference materials in this project by including hypertext links in their preliminary and final analyses to give them depth and substance. This activity brings students into direct contact with information sources and provides opportunities for collaboratively evaluating and transforming the information they encounter. Deciding which links to include and how to incorporate the links into the narrative requires team members to think carefully about how their topic relates to other events and concepts as well as to evaluate the usefulness and appropriateness of information sources on the Internet.

Web Tutorial Project. By far the most challenging and rewarding aspect of the course is the Web Tutorial Project. Teams of students develop a Web-oriented tutorial on a social psychological topic of their choosing, with the target audience for the tutorial being students in an introductory course in social psychology. The project is an ongoing activity for most of the semester that students complete in stages, with each team providing the rest of the class with progress reports and receiving interim reactions and suggestions from other class members. The final versions of the tutorials are published on the course Web site. The tutorials incorporate many of the transformational components of the other projects, and they explicitly place the students in the role of knowledge producers and facilitators of others' educational experiences.

Facilitating Active Learning

End-of-course assessments of these three projects have indicated that students are particularly motivated by the fact that their work is available for others to examine and that their projects might assist other students in learning about social psychology. For example, regarding the Web Tutorial Project, one student commented on the course evaluation: "I felt I gained the most from this project because it can help others to learn." Other students focused on the accountability and authorship aspect of the Web projects: "I think it's really cool to see my name on the Web—to know that my work exists there," and "By posting our answers to things on the Web, I found myself checking my answers because I knew the potential existed for others to see them." These quotations illustrate students' realization that the Web activities changed the nature of their role from passive and private receivers of information to active and identifiable producers of material who potentially can impact the educational experiences of other people. This awareness of the "transforming" quality of technology (Kiesler, 1997) may allow students to evaluate other technological innovations and educational experiences more critically.

In future offerings of this course, students will continue to learn by creating online materials that are designed to inform and educate others. In addition, the materials they produce will be incorporated into the curriculum of other courses during the same semester. Students in low-

er-level courses will work through the educational modules, evaluate them, and provide feedback to the advanced students regarding their effectiveness. This integration of curriculum across levels will result in a number of potential benefits for both advanced and introductory students. In particular, all students will have an increased awareness of the variety of ways knowledge can be produced, acquired, communicated, and evaluated.

From Bosnia to Dayton: The Web as an Authentic Journalism Experience

Linda Crider

As a journalist, I did not go looking for the Internet. Instead, the Internet found me. I wish I could say that I recognized early on the power of the Internet as a communication and teaching tool. Like many of my newspaper colleagues, however, I was drawn into the medium reluctantly as it became more and more important in the industry.

Course Goals

Learning by Creating Web Sites

In October 1995, the Bosnia peace talks came to Dayton, Ohio, where I have worked as an editor/designer for the *Dayton Daily News* for the past 15 years. One of my colleagues asked if I was interested in working on a joint project between the newspaper and journalism students at Miami University. I found six students who were willing to learn the hypertext markup language and other technical skills necessary to construct a Web site that would act as a companion to the newspaper's Web site. The newspaper wanted the students to drive the project. I was to oversee, but not dictate, the effort. The students' mission was to post invitations around the Internet asking readers to take part in a conversation about the Bosnian peace process.

At first, the students were giddy with the power of instant publishing. Their site featured lots of color, graphics, and animated graphics. But it did not feature much in the way of substantive information. When the first responses to the site started rolling in from Bosnia, France, and other points around the globe, they were not favorable. Many of the readers took offense at some of the language on the site. A Bosnian reader described the tone as glib and offhanded, as if real people were not suffering in a real war. Some criticized the design and the animated graphics as "amateur."

The students were stunned. In spite of their ease and familiarity with the World Wide Web, it had not occurred to them that real people would be reading and responding to their work. They found themselves accountable as journalists in a way that I had never been able to replicate in a classroom. They fell to work again. This time, they agonized over every decision. Is this color "right"? Does this introduction and overview have enough information about the project and the peace talks for the reader? How could the site "serve" the reader better? Not only were the students critiquing their own work, they were critiquing each other's work in substantive ways. This time, *I* was stunned.

My students learned a lot from that project, but I learned even more. If my colleague in charge of the newspaper's Web site had not insisted, I would never have allowed the students' first site to be posted. All of my being—as a teacher and as an editor—cringed when I saw and read the first site. I agonized about whether to allow the students to move forward with what I considered a substandard plan. But what I saw happen transformed my teaching and transformed me. The student who served as the managing editor for the Bosnia project graduated that December. He took a job immediately with the *Cleveland Plain Dealer*'s New Media division and now works for the New Media division of the *Los Angeles Times*.

If this concept could work with six students, what about 60? In the next project, a group of more than 60 students worked for the Associated Press, Reuters, Agence-France Press, United Press International, and various individual newspapers as writers, copy runners, typists, film messengers, and general "gofers" in 1996 during the Olympic Summer Games in Atlanta, the Republican National Convention in San Diego, and the Democratic National Convention in Chicago. The students also covered these events for a Web site. Cox Newspapers, which owns the *Dayton Daily News*, linked to the student site from its own professional sites covering the events.

The students, who posted more than 60 stories on the site, represented disciplines from across the campus. The word *interactive* became crucial to this mix. Not only were the students interacting with me as their instructor, they were interacting with students in other disciplines, with professional journalists, and with readers. This interactivity created a rich mix of ideas and conversations that added to the students' collective thinking about their work. This was not a fluke; this was a new way to teach journalism.

Since fall 1996, a Journalism Senior Capstone class in Interactive Media and Web Journalism has been supported by the *Dayton Daily News*, Cox Interactive Media, and the *Chicago Tribune* Interactive. Many non-journalism majors want to take the class. As much as possible, we accommodate them. I am convinced that when students from art, music, business, political science, journalism, sociology, systems analysis, and a number of other disciplines gather to work on a project in the global venue of the Internet, learning is enhanced by their different perspectives. Miami University now has more than 25 journalism graduates working in the field of Internet publishing. In addition to Los Angeles, they are employed at the *New York Times*, the *Chicago Tribune*, the *Atlanta Journal and Constitution*, the *Dayton Daily News*, the *Cleveland Plain Dealer*, and several smaller newspapers. They also are doing online work at software companies, accounting firms, nonprofit agencies, and a host of other businesses.

Facilitating Active Learning

As a result of these teaching experiences, I have had to expand my notion of the classroom. It is no longer contained by four walls. It encompasses a virtual space and includes a host of online readers who serve as virtual teachers by critiquing the students' work throughout the semester. I also have had to give up my position at the top of the classroom hierarchy and adopt the role of facilitator. In this decentralized environment, with enhanced intellectual exchanges, students look to each other for instruction as often as they look to me. I am not the disseminator of all classroom knowledge. Instead, I find myself serving as a resource, a coach, and an editor who guides them in their search. This is not a diminished role, as some may perceive it. I find myself continually amazed at how hard the students push themselves. Then they thank me for how much I have "taught" them. These experiences also have added a new dimension to my thinking about my discipline and about how students learn in this new medium. I look forward to exploring this new frontier further as a journalist and a teacher.

Discussion

We are beginning to see the emergence of a Miami University Model for Internet-intensive education. This model is student-centered (Wolfe, 1992), requiring students to take a much more active role and requiring faculty to take more risks. These risks are both technological and pedagogical in nature. We use phrases such as "toward a Miami University Model" and "emerging Miami University Model" to indicate the embryonic nature of the work. We call it the *Miami University* Model because it arises from the best practices of Miami faculty, supported by Miami's Learning Technology Enrichment Program. We do not contend that the practices we have described are unique to our institution, however. The model is designed to help readers consider the role of technology in their institutions and distinguish between the practices at this traditional university and those of virtual universities and other information service providers.

Learning by Creating Web Sites

It has been said that the best way to learn something is to teach it (see Wolfe and Myers, 1996). It seems that we finally are applying this wisdom to teaching with the Internet. For example, Sherman facilitated the learning of his upper-division social psychology students by having them create courseware for lower-division students in a course they had taken the previous semester. Mayer had his environmental geology students edit a newsletter. McBride had his economics students generate data and then test those data against economic models. Whether it be through an online auction or a preference survey, students gain a sense of connection when they reflect that "we ourselves created these data, and they actually fit [or don't fit] the model." Crider had her journalism students "learn by doing" every aspect of the journalistic process in putting together a virtual newspaper. Sherman and Crider, in particular, found that students were highly motivated by making contributions that reached both a local and worldwide audience (Wolfe & Myers, 1996). The students demonstrated a pride of authorship and a recognition of responsibility for their work that the authors rarely have seen in college students. The experiential learning (Kolb, 1984) exhibited in these four case studies is a cornerstone of the emerging approach to Web-based teaching at Miami University.

Facilitating Active Learning

In each of these four cases, we see a shift in the role of the instructor from information provider to facilitator, a role analogous to that of a coach or editor. Although the expertise of the faculty, both in terms of content knowledge and teaching ability, is of critical importance, the approach to teaching is changing. Rather than using valuable class time exclusively to convey information, these faculty are using class time to mentor students in their development within these fields of study. For example,

by using the Internet to deliver materials formerly given in lectures, McBride has freed up time to play the role of facilitator with the aim of helping students to "think like an economist." Students participate in market experiments, which generate data. These online experiments help to create an environment in which students can experience economists' conceptions of the world and compare them to their own experiences. Working in cooperative groups, students then apply the principles to new situations.

These kinds of powerful learning experiences rarely occur spontaneously. The benefits are obvious—but so are the risks. Creating these experiences requires careful planning, active listening, confidence, flexibility, and a healthy tolerance for ambiguity. Shepherding students through these experiences requires a sophisticated understanding of the process of learning and a reflective approach to the role of professor. As an additional benefit, the instructor's new role as facilitator increases both the quantity and quality of student-faculty interactions. Over the last 25 years, researchers consistently have found that these kinds of interactions promote student satisfaction and achievement (Astin, 1977, 1993; Gaff, 1973; Pascarella & Terenzini, 1991; Wood & Wilson, 1973).

Enriching Intellectual Exchanges Among Students

As opposed to the "just-in-time" model for information transmission, our emerging Miami University Model for Internet-based teaching fosters intellectual exchanges among students, between Miami students and faculty, and among Miami students, faculty, and others around the world. For example, Mayer's Web pages have received tens of thousands of visitors. Many of these visitors have sent e-mail, which he has shared with the entire class or with individual students. Sherman has been able to help students make more sophisticated connections between academic subjects and everyday life and share their insights with one another. Crider provides a powerful example of a transformative educational experience. At first, students seemed to approach the Dayton Peace Accords Project as "just another school assignment." When they began receiving e-mail from people who were deeply and directly affected by the events they were reporting, however, their perspective changed dramatically. The very existence of e-mail from Bosnia conveyed the message that "this is serious business" and that, in a very real sense, they were "playing for keeps." This motivated the students to take their work seriously and raised the level of intellectual discourse. Such intellectual exchanges among students, particularly when they occur early in the

students' college careers, have been found to be important predictors of long-term success (Upcraft & Gardner, 1989).

Extending the Sensibility of the Seminar

A good college seminar possesses a certain sensibility. Having students participate in a small seminar during their first year of college has been linked to higher retention rates, better academic performance, and more positive uses of student services (Fidler & Hunter, 1989). We view the Internet as a tool for extending the sensibility of the seminar—in space, through time, and to many more students than can comfortably fit around a seminar table. For example, Mayer discussed the importance of receiving feedback from students throughout the semester about what is working and what is not. Although this often is not possible in a standard large lecture class, the Web makes feedback available immediately regardless of class size and conveys to students the sense that "we are in this together, and we all have a responsibility for making it work." McBride's work demonstrates that it is possible to extend the seminar sensibility across time and space, enabling one-to-one and one-to-many cooperative learning experiences. Cooperative learning (Johnson & Johnson, 1975, 1987), critical thinking (Wolfe, 1995), and intellectual engagement are hallmarks of an effective seminar.

It is not our intention to oversell either the Internet as a learning technology or the notion of a Miami University Model for using the Internet in teaching. Although the courses we have reported on may be considered Internet-intensive, many of us teach other courses in which we elect to use the Internet little, if at all. Moreover, to the extent that we are developing a Miami University Model, we are doing so organically. Thankfully, there are no administrative dictates on how or when to use the Internet at our institution.

We six are intrigued by exploring similarities and differences in our approaches to teaching, and we are delighted to learn from one another. Nonetheless, there are obvious differences in our fields of study, and important differences in philosophy and practice. It also must be noted that our claims of success are anecdotal rather than scientific, and that we have not dwelt on difficulties we have encountered, such as technical problems. We believe that the developing model at Miami University is effective because it is sensitive to the major individual and environmental factors affecting learning and teaching. The approaches we outline here afford opportunities to cater to many individual learner characteristics and learning styles. Moreover, the student-centered nature of the

Miami University Model and the global reach of the Internet dramatically impact students' perceptions of their accountability and their roles. This approach also plays an important part in enriching immediate environmental factors. For example, the use of e-mail, chats, and feedback forms creates new opportunities for social support. In a similar vein, the use of animation and smart graphs significantly extends the sensory conditions supporting learning.

Perhaps the most intriguing aspect of the emerging Miami University Model is the interplay between the Internet and the organizational context of Miami University. The wealth of information on the Web, including course offerings, raises the questions "Why *go away* to college?" and, particularly, "Why go to *Miami?*" In this new era, perhaps some institutions of higher learning will fail, and others will be replaced by virtual universities and merchants selling knowledge on the Internet. However, we believe that Miami University is finding a place on the Internet that is rooted in the university's best traditions.

Although we cannot predict the future, we do see value in our work that could not be provided by a virtual university or another kind of commercial information provider. If Noam is correct that "Education is based on mentoring, internalization, identification, role modeling, guidance, socialization, interaction, and group activity" (Eamon, in press), then perhaps the Miami University Model takes one small step toward adapting technology to ensure the university's place in higher education for the 21st century.

Footnote

[1]Sherman's Advanced Social Psychology course Web site address is: <http://miavx1.muohio.edu/~shermarc/p324s98/p324s98.htx>.

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Much of the work reported here was supported by the Learning Technologies Enrichment Program at Miami University.

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