

PROMOTING INTERACTION THROUGH ON-LINE COURSES

Norman Tyler

Eastern Michigan University

*The medieval university looked backwards;
it professed to be a storehouse of old knowledge. . . .*

The modern university looks forward, and is a factory of new knowledge.

Thomas Henry Huxley, English biologist. Letter, 11 April 1892.

Introduction

In recent years, many new computer technologies have been integrated into university teaching and learning. One of the most significant technology innovations is the use of the Internet for expanding the scope of the college “classroom.” In an increasing number of situations, the Internet is supplanting the campus library as a primary information source. Course syllabi now regularly include web sources as references, and instructors refer students to the Internet for the most current information on a wide variety of topics.

An even greater potential for changing the very nature of the traditional classroom is found in the increasing experimentation and use of on-line courses. By combining the potential of the Internet with on-line courses, the possibilities for new forms of interaction for students is significant. This paper explores some of these possibilities, and looks at the use of on-line resources, computer conferencing, web-based textbooks, and on-line simulations. It first looks at the impact technology has had and is having on higher education by asking two questions—first, is technology developed enough to effectively use on-line courses and, second, what are its

pedagogical implications. It then reviews current examples of on-line courses which utilize new potentials for interaction available in the web environment.

Harasim (1995) predicted that the emerging paradigm for college instruction in the 21st century would be “network learning,” a computer-mediated environment in which place-independent, asynchronous interaction could occur among groups of people linked by an electronic network. In a presentation to Congress, Dede (1996) claimed that to “achieve major gains in educational outcomes and to prepare students for the 21st century society, we must use technology to support innovative models of teaching/learning rather than simply automate conventional pedagogic approaches.” In the same speech, Dede also suggested the environment for future modes of pedagogy:

1. “knowledge webs will complement teachers, texts, libraries and archives as sources of information;
2. interactions in virtual communities will complement face-to-face relationships in classrooms;
3. experiences in synthetic environments will extend learning-by-doing in real world settings; and
4. sensory immersion will help learners grasp reality through illusion.”

Papert (1993) recognized that computers have the potential to dramatically change education, but also realized such changes will be difficult to measure, and concluded, “a system of tests based on old models of learning will at best reinforce those models and inhibit the development of new directions” (p. 211). Papert saw computers having a positive impact on education only if they were part of much bigger changes—changes in our thinking about learning and teaching. He concluded, “computers serve best when they allow everything else to change.” (p. 148) He envisioned changes which would fundamentally alter what and how subjects are learned in school.

How will teachers respond to such dramatic and systematic changes? Some teachers are quite concerned, as is represented in a letter signed by 700 faculty at the University of Washington. The letter responds to a proposal by the state governor calling for more emphasis on “digital education.” The letter in part states, “While costly fantasies of this kind present a

mouth-watering bonanza to software manufacturers and other corporate sponsors, what they bode for education is nothing short of disastrous. . . Education is not reducible to the downloading of information, much less to the passive and solitary activity of staring at a screen. Education is an intersubjective and social process, involving hands-on activity, spontaneity, and the communal experience of sharing in the learning enterprise.” (Noble 1998)

Others have considered the response of faculty members to such systematic changes. Over a ten-year study period, Hall and others (1975) at the University of Texas looked at how teachers responded when basic changes were made in their teaching environment and found a continuum of “Stages of Concern.” The four stages they recognized were: unrelated concerns (awareness); self concerns (the need for more information, and how an innovation will affect us personally); task concerns (management issues); and finally impact concerns (consequences for students, collaboration with others, and refocusing that may result in an entirely new method and, therefore, a new cycle of concerns).

The use of on-line courses:

Many universities now offer on-line courses, often on an experimental basis to “test the waters.” Many of these courses are in fields relating to science and technology, where the Internet simply serves as a resource for data. But as more courses that are issues-oriented are placed on the web, the pedagogical concerns of teaching and learning become more problematic and acute. Can a context for learning be placed in an on-line environment, or is the need for a classroom interface too integral and critical to allow this to happen successfully?

Eastern Michigan University is among the first wave of traditional universities to develop offerings of fully on-line courses—i.e., courses with no classroom component. Their “NetClasses” have covered courses as diverse as French, Genetics and African American Theater. “Issues of Historic Preservation” was developed as an on-line issues-oriented introductory course, and includes preservation topics as varied as its history, administrative structure, legal basis, economic analysis, and even architectural styles. Being one of the university’s first on-line courses, its development was an experiment supported by university administrators who wanted to better understand the potentials and pitfalls of such offerings. Although based on an existing classroom course, its conversion to a web format required rethinking important assumptions about teaching and learning.

Two questions took on a primary role during the course's development period. First, had Internet technology developed to the point where both instructor and students could readily function in a totally on-line environment? Second, how were issues of teaching and learning affected by this method of communication? The answers to these questions are discussed in the following sections.

The impact of technology

The first question was easier to answer. On-line use has proceeded through a number of generations of change since the relatively recent days of the early Archie, Veronica and Gopher interfaces common in the early 1990s. Current technology, available through Internet browsers such as Netscape and Internet Explorer, has advanced quickly during this decade and is more than adequate to make on-line courses readily available to most students. The expertise needed by faculty and students no longer needs to be “leading edge,” but can be learned easily and adapted as needed. Indeed, it may be preferable to offer on-line courses with technology one or two steps removed from the leading edge. For example, developing web pages for earlier versions of Netscape or Internet Explorer web browsers rather than the latest versions should be considered, since they provide sufficient resources and “bells and whistles” to create rich learning environments and do not shut out students with slower modems or older software who cannot take advantage of the latest versions.

Computer Conferencing:

The Internet browsers described above provide one type of resource for on-line courses. Another is the use of computer conferencing for discussion and dialog. Computer conferencing has become widely available and is used in ways only envisioned a few years ago. Research has shown computer conferencing to be an excellent educational tool because it encourages student participation in a course. Participation by students is often minimal in an on-campus classroom. Even though they have a physical presence in a classroom, students often sit back and see their role as observer and listener in an atmosphere dominated by “teacher-talk.” However, using computer conferencing a student does not “exist” until he or she speaks up by submitting a message on-line. On-line student comments also tend to be more coherent and well thought out than the typical token responses made by students during classroom “discussion.” McInerney (1997) has compared on-line discussion to a chess game played by e-mail. Participants are able

to review previous comments or “moves,” and then develop their own responses or “counter-moves.” As he has observed, by reviewing computer conference postings one gets the feeling that one is following a typical, but very well thought out, class discussion.”

It is important to understand factors involved in students’ willingness to participate in on-line discussions, for there are both advantages and disadvantages to this approach. Some on-line instructors have found students felt uncomfortable posting their own thoughts too early in a semester for fear these ideas would be found wanting later. This reluctance to post can be overcome by allowing students to revise their earlier messages as often as they wish. As described by one instructor, “...we came to an agreement that every comment posted would be understood to be a work in progress, always subject to revision in a later posting. We agreed that it was all right to float trial balloons, to think aloud, and to otherwise try on ideas and points of view” (McInerney 1997). This approach also reinforces the “writing to learn” pedagogy advocated by many educators, where the responsibility is put on students to explore topics through writing. “Writing to learn depends upon an active rather than passive approach to learning....Research on the composing process has shown that writing is not a simple process of transcribing a predetermined text, but a complex process of discovery” (Mayher et al. 1983, 78). Eastern Michigan University’s “Writing Across the Curriculum” program, now more than 15 years old, recognizes the educational value of writing to complement reading and listening. As stated in one of its principles, “Writing is an essential, integral element in the learning process itself.”

Computer conferencing has also been found to promote diversity. It can empower students who might not readily participate in classroom discussions, including women and minorities. As described by a student who just had completed an on-line course:

“It has definitely made me think more critically. Sometimes when talking in small groups it is hard to get your opinion stated... because your thoughts just get stirred up in your head and you cannot verbally say what you are thinking. It is much easier to write down my thoughts because I can type as I think....It helps to have it right there in front of you because I can always go back and refer to someone else's statement as well as my own.” (Pugh)

Asynchronous learning:

Another advantage of on-line classrooms is the concept of asynchronous learning—that is, learning outside the strictures of time and place. Asynchronous learning allows students to participate both where they want (assuming there is access to a computer) and when they want. Mason (1998) identified four crucial advantages to the asynchronous approach and arranged these advantages in descending order of significance:

“Flexibility—access to the teaching material (e.g. on the Web, or computer conference discussions) can take place at any time (24 hours of the day, 7 days a week) and from many locations (e.g. oil rigs).

Time to reflect—rather than having to react 'on one's feet,' asynchronous systems allow the learner time to mull over ideas, check references, refer back to previous messages and take any amount of time to prepare a comment.

Situated learning—because the technology allows access from home and work, the learner can easily integrate the ideas being discussed on the course with the working environment, or access resources on the as required on the job.

Cost-effective technology—text-based asynchronous systems require little bandwidth and low-end computers to operate. Thus, access, particularly global access, is more equitable.”

Jaffee (1998) has noted “the response to class discussion questions in the ALN course far exceeded—in both quantity and quality—anything I have experienced in a conventional classroom setting.” He cites a number of reasons for this. First, students are less inhibited in participating than when they are being directly observed by classmates. Second, students have more time to reflect on a response than in the classroom. Third, discussion is not dominated by the first student to speak. Fourth, because students are composing answers or responses that will be read by both the instructor and other students in the class, they are motivated to demonstrate a solid grasp of the material and present their arguments in a convincing way. It has also been observed that, unlike a classroom setting, the fact that one student has responded to a question does not necessarily relieve other students from an obligation to also respond.

Initial evidence indicates the most important advantage of on-line courses is their asynchronous nature. Students are able to complete their work when they want, and from wherever they are located. Studies have shown that on-line students tend to be most active later

in the evening, with the typical log-on time being 9 pm. This flexibility is especially important to older students who have work and family schedules to accommodate, and may correspond to what some instructors have observed, that the average age for on-line students is in the 40s. (Majors and Levenburg 1997)

The problem with technology

Solving the technology component of on-line course is necessary, but by itself is not sufficient for success. Many instructors have found satisfaction in solving the technology issues of teaching, but have failed to grasp the more important teaching and learning issues. This is evidenced by the plethora of courses now available which have sophisticated web usage but primitive teaching methods. Faculty can fall into a trap of developing sophisticated means of communicating and still have little to say. Neil Postman, in a talk given to the German Informatics Society, gave a warning this way:

“Through the computer, the heralds say, we will make education better, religion better, politics better, our minds better—best of all, ourselves better. This is, of course, nonsense, and only the young or the ignorant or the foolish could believe it.

“As things stand now, the geniuses of computer technology will give us... instantaneous global communication, and tell us this is the way to mutual understanding. They will give us Virtual Reality and tell us this is the answer to spiritual poverty. But that is only the way of the technician, the fact-monger, the information junkie, and the technological idiot... Here is what Henry David Thoreau told us: 'All our inventions are but improved means to an unimproved end.'“ (Postman)

Postman reminds us that the first priority should be teaching. To be successful, on-line courses must go beyond technological issues to important pedagogical issues. Faculty must look at and better understand how learning is experienced at the student's end of the modem link and develop teaching methods that better utilize this new technology.

Pedagogical issues

Traditional classroom courses typically are “linear” in format, with learning happening according to a defined schedule, and in a step-by-step manner, over the fifteen weeks which

make up a semester. In this traditional approach to a subject, an instructor essentially begins the first class by stating, “It is now time to learn about biology. Open up your textbook and we will begin with Chapter 1.” Following this introduction, throughout the duration of a course students are lead through topics in a systematic and orderly manner.

This linear approach is neither easy nor desirable in an asynchronous, learner-controlled environment. Learning doesn’t necessarily begin at the “beginning,” but wherever there is a recognition by a student of a need to know and understand a topic. In a learner-controlled environment, learning may begin with any of a variety of topics, and then spread in a spider-web pattern to include both an expansion of the original topic and crossovers to related topics. This “nonlinear” approach is similar to the learning of young children who ask a simple question out of curiosity and use this knowledge to build into other areas. For instance, a child may have a fascination with big animals, which leads to an interest in dinosaurs, and then geology, and eventually to history and evolution. The on-line environment, it can be argued, better represents this way of learning naturally.

On-line courses are more than simply traditional classroom courses with an on-line component—that is, giving lessons through e-mail. They rely entirely on the use the web, and as a result suggest a rethinking of how faculty teach and students learn. Because course information in web format rather than in the form of a hard copy textbook, students may jump into topics in the middle, and “web their way” backwards and forwards. They may begin with a topic in which they have a particular interest and branch out in various ways—by jumping to related pages on the course's web pages, exploring posted course materials, finding related external sites, and joining the course's on-line discussion conference. It is difficult for on-line instructors to restrict this more random approach, nor should they desire to do so.

The asynchronous on-line environment utilizes this mode of learning by promoting the concept of learner control. The term “learner controlled instruction” (LCI) represents learning in which students can direct the path, pace, and/or contingencies of instruction to a greater degree. Since on-line students are physically separate and apart from their instructor, there is increased importance in learner self-motivation and control. One of its keys to this approach is allowing important learning decisions to be made by the learner, rather than by the instructor. The instructor’s role is not unimportant, but it is non-traditional. The instructor has two primary

responsibilities—first, to design the appropriate learning environment and, second, to facilitate the involvement of the learners. As presented by Frank Wydra in 1980, LCI accepts the following as its parameters: (1) instruction takes place in a controlled environment, (2) the instructional designer manages the environment and not the instruction, and (3) the learner has control over his or her movements within the environment, including the decision to stay or to leave. Goldsmid and Wilson (1980, 297) see the role of the instructor as a “benign disrupter” who arranges the material in such a way that students “bump into the unexpected.” Lepper (Lawless and Brown 1997) suggested that learner control may increase student feelings of competence, self-determination and intrinsic interest.

A learner controlled environment can benefit from a closely aligned technique—“problem-based learning (PBL).” In problem-based learning a student’s “need to know” is based on a problem presented by the instructor and which can be resolved through exploring available resources. The focus is on challenging students to solve real-world problems.

Many disciplines can use problem-based learning as a means to encourage student interaction. One discipline where it works well is urban planning. As an example, in one course at Eastern Michigan University, urban planning students are asked to address the planning issues relating to an adult bookstore that has opened in the fictional study city created for the course. Dealing with the bookstore becomes a problem-based exercise for the students. In their role as city planners, they are first asked to respond to concerned citizens who are demanding the store be closed by the city. From this simple problem, they must broaden their scope of knowledge, first by determining what powers the city has over a specific land use. This establishes the need to understand zoning, its powers and its limitations. Since in most instances zoning will not address the problem of a business that is already established, the next step is to better understand other powers a city has to deal with such problems, which means an exploration of the broader role of city government. Because residents are upset, the student planners need to expand their understanding beyond strictly administrative factors, and also understand how to work with citizens, using principles of citizen advocacy and strategic planning, as well as considering their involvement from the perspective of professional ethics. If the instructor facilitates the exercise effectively, students find themselves exploring an expanding web of knowledge that is both

available and needed to address this one “simple” problem. The learner-controlled, problem-based approach brings a dynamic to learning that cannot be duplicated with other methods.

Use of on-line simulations

As described above, both student-to-instructor and student-to-student communication can be enhanced in the on-line environment. Because of the nature of the medium, communication on-line can be more thoughtful and open-ended than in a traditional classroom setting. Similarly, on-line simulations and role-playing exercises can be used to promote further interaction.

Simulations have been shown to be an effective way to create environments for learning. They contribute as an invigorating way for students in a number of ways: 1) to practice “social imagination,” a hallmark of human social intelligence that allows students to grasp other points of view; 2) to explore different ways to respond or behave in a situation; and 3) to apply information to realistic scenarios. Richard Powers, a psychology professor with extensive experience designing and facilitating simulations, has observed that playing a role in a good simulation generates empathy in most players, and players develop insights about a problem because they see it through the eyes of others.

This is especially important in the training of planning students, a field that often needs to reconcile widely varying points of view. Good simulation games present slices of life in a “safe” environment and within a compressed time frame. They create experiential “hooks” upon which to hang cognitive information and encourage multidisciplinary thinking. They also accomplish a number of learning goals, as they:

- promote long-term retention;
- demand team work, compromise and negotiation skills;
- expose students to many points of view; and
- help bridge the gap between a student's knowledge and experience.

The Rivertown Simulation

The Rivertown Simulation was developed for a graduate course in downtown revitalization planning. Its purpose is to promote discussion of downtown issues by having students participate as members of the community of Rivertown, a fictitious small city located “somewhere between Ohio and Michigan.” Although growing from other popular urban

simulations, such as the Community Land Use Game (CLUG) and SimCity, the Rivertown Simulation is markedly different in both its format and its goals. CLUG is a well-known city planning simulation exercise created in the 1960s by planning faculty at Cornell and still used today. Created for group play, participants make decisions on which land uses should be placed where on a hypothetical city grid. CLUG deals primarily with economic motivations driving decisions of city growth, and although it includes other planning issues, success in CLUG is evaluated largely according to economic criteria and how successful one has been financially. In contrast, SimCity is a popular computer software program in which a single player works solely in a computer-based environment and is challenged to construct a growing and healthy city by placing various city functions on a computerized undeveloped land grid. It is an exercise which is basically entertainment in which a player tries to optimize his or her decisions within the computer algorithm set up in its programming.

In both of these examples, participants try to beat the system, whether the “system” is other players (CLUG) or a computer program (SimCity). In contrast to these two now classic simulations, the primary goal of the Rivertown Simulation is not to beat the system, but simply to promote discussion of planning issues among its participants. It has no “winners” or “losers,” but evaluates success through the depth of discussion of its participants and their understanding of issues critical to downtown revitalization.

Students first experience Rivertown through a large birds-eye perspective drawing:



Sketch of Rivertown

The simulation is introduced to participants in the following way:

“The Rivertown Simulation is not played as a traditional board game, with winners and losers. Rather, its purpose is to create a simulated setting—in this case a section of a city with older downtown buildings—that gets students involved in making decisions encouraging revitalization of the downtown. The simulation represents the process one would go through in deciding, for example, whether a historic district should be established in the downtown, how best to cope with an adult book store, or whether city funds should be used to build additional parking. It looks at these decisions from various perspectives, including that of merchants, city officials and residents.

“As in real life, not all the rules and strategies for involvement are apparent immediately. However, a player can see the results of decisions over a span of time and can also see how decisions of others can impact their involvement, both directly and indirectly. The balance of competition versus cooperation among

participants must continually be assessed. The element of chance plays a minimal role in the simulation. There are some risk factors, but essentially the larger “risks” are inherent in how well development decisions are made in Rivertown's continuously changing economic micro-environment.” (Taken from Tyler course syllabus, 1997)

Although the Rivertown Simulation had been used for many years in the classroom, it was only recently adapted to an on-line environment. The initial runs of Rivertown on a computer conference were more successful than anticipated. Perhaps the best way to illustrate the effectiveness of this form of interaction is by including a portion of the discussion from an early run on one of the more controversial issues in Rivertown, the opening of the “Adult World Book Store” in an underutilized downtown building. (Affiliations of the participants are shown; names have been changed.)

Ben (a historic preservation student at the University of Missouri): Does the owner of this new adult book store have any information on his clientele?

Norm (simulation developer and author of this paper): The Adult World Book Store seems to be attracting primarily men, coming in from all sections of the city. They are a diverse group, some wearing grubby clothes and some wearing suits. Little else is known of the store's clientele.

Jeff (an urban planner from New York City): Bryan, I'll tell you about the people going to this place; they're sick, perverted souls. If the city council doesn't do something to shut down this house of sin, we residents of Rivertown will mobilize to shut it down ourselves!

Robert (an consultant in Cambridge, England): Other than George, have any Rivertown residents protested? Certainly the presence of this bookstore will increase pedestrian traffic through the area, but it will lower property values as well. How does the city council feel about it?

David (a student at the University of Toledo): I, for one, feel that until some adverse effects begin to arise which can be said to be a direct result of the Adult World or its clientele, then the business which Rivertown needs immediately in order to provide its

citizens with better services deserves the same cooperation from the city as any other enterprise. I'll be the first to admit that I'd much rather see a pro football stadium in that spot, but let's face it, we are, at this time, capital poor. I'm not willing to sacrifice the town just for money, but the Adult World store simply has done nothing outside the law to warrant anything other than caution and concern, which I also share.

Dora (a planning student at Ohio State University): The proprietors of this establishment should be aware they are being watched to ensure detrimental effects upon our community do not occur. I pretty much agree with Dan.

Jeff again: TO THE OWNER OF THE ADULT WORLD BOOKSTORE: Please understand that you have made an error moving into this town. Starting Friday, July 26th, outraged members of the community will start a DAILY picket of your establishment. We will be armed with cameras and will not stop until you have left town. Move now to avoid any conflict.

And Ben again: As an entrepreneur I cannot sit back while particular residents attempt to close a business just because they happen to disagree with its products and/or clientele. Will my deli be the next victim? Will some group decide that selling bratwurst will corrupt children? This Friday I will “proudly” patronize Adult World, and I urge others to join me. We need to show that businesses in the downtown are encouraged to grow, no matter who they are, or what they sell.

And so it went. Over a seven week period hundreds of messages went back and forth between participants, each illustrating the development of a viewpoint on this and other issues of downtown revitalization.

Interaction between courses

As shown above, opportunities for interaction abound in the on-line environment. They also can include bringing together on-campus and off-campus students. These possibilities were explored in 1998, when the Rivertown Simulation was used concurrently in three separate courses, where students brought varying perspectives to the exercise. Students in the graduate downtown revitalization planning course described above were assigned the roles of merchants and property owners and were primarily concerned with the economic development of

Rivertown's downtown. Students in an undergraduate historic preservation course became members of Rivertown's Historic District Commission whose goal was to protect the community's historic heritage. Graduate students in an on-line course in historic preservation assumed the roles of residents, who were concerned primarily with quality-of-life issues and the conflicts inherent in residential districts adjacent to the downtown. Although the students in the separate courses never saw each other, they met in the cyberspace world of Rivertown. Students from the three courses dealt with a number of planning issues shared in common, and their discussions were grouped by topic on the computer conferencing software. Through this on-line "town forum," their discussion gradually built toward resolution of the various issues.

As the experiments with on-line interaction has progressed, there have been increased opportunities to show how the on-line environment promotes interactions of many kinds. In total, there were eight ways in which interaction was explored and exploited during this time.

1. The Rivertown Simulation set up a simulated, but realistic, learning environment with which students needed to be involved.
2. An on-line textbook (described in the following section) made available a web-based resource for relevant information and background readings.
3. External links to other sites encouraged students to draw on resources available throughout the web.
4. A group of professional planners agreed to serve as downtown on-line consultants to the students. Based on their areas of expertise, e-mail links to each of them were interspersed on the simulation's web pages.
5. Fictional characters were created for the Rivertown Simulation, including a resident (Ima Peebles), a member of city council (Dee Lemma), the city planner (Burnham Daniel), a local historian (Clara Story), and a shady local merchant (Nipsy More). These characters gave the instructor alternate "voices" and allowed important perspectives, which may have been otherwise overlooked, to be heard.
6. By taking on the role of manager of Rivertown's First National Bank, the instructor was able to steer the exercise through control of the relative economic success of various decisions made by students, indirectly affecting events and future decisions.

7. Issues to be discussed in the various courses were brought into the simulation through articles in the Rivertown BUGLE, a fictional local on-line newspaper.
8. Regular “citizen polls” were included in issues of the Rivertown BUGLE to indicate to students how successful their revitalization strategies had been. Controlled by the instructor, the polls gave feedback on both the changing overall health of the downtown and on the effectiveness of the students serving on Rivertown’s City Council.

The three concurrent courses described above, coupled with the Rivertown Simulation and its many forms of interaction, created a rich and stimulating on-line learning environment. The dynamic resulting from this blend of traditional classroom students with on-line students went well beyond the typical classroom seminar discussion, for various activities and involvements happened simultaneously. Learning went on in a variety of forums—students interacted with other students, both in their classroom and via the web; graduate students interacted with undergraduate students; students at a distance (Missouri, Louisiana, etc.) interacted with campus students in Michigan. As shown by Gilbert (1997), “This medium lends itself to student-focused rather than instructor-focused discussion. I see this as a strength and would recommend any instructor take full advantage of this.”

On-line textbook

A significant problem inherent in on-line courses is the dichotomous learning modes of on-line resources and traditional hard copy textbooks. To be successful, an on-line environment should be complete in itself. Unity of method is lost when a “linear-format” textbook is coupled with the nonlinear, asynchronous format of an on-line course.

With the author’s first on-line course, an attempt was made to deal with this dichotomy by making the course textbook, *Issues of Historic Preservation* (Tyler 1994), written as a traditional textbook, available on-line. For the on-line course, each of the book’s fifteen chapters were reformatted as web pages, using the web-based language of HTML, and the book’s graphics were scanned and placed onto these web pages. Throughout the semester, the textbook was used for reading assignments, and on-line discussions were linked to the appropriate pages.

This attempt at adapting a traditional textbook to an on-line environment was found to be an almost total failure. Many students ignored the on-line text, and instead felt it necessary to buy a hard copy version. Other printed out the pages from the web so they could be read in hard-copy form. When surveyed, they cited a number of reasons for utilizing the web-based version of the text—it was too difficult to read a textbook on the computer screen, it took too long to download, and it was generally an unfamiliar and uncomfortable process for them.

It was obvious a change was needed before teaching another on-line course. The second course developed by the author for on-line use was the graduate course in downtown revitalization planning. For this course, no textbook had been used when taught in the traditional classroom setting, only a loosely organized course pack. Using these course pack materials as a starting point, work began on the creation of an “on-line textbook.” The new textbook was written exclusively for on-line use; it would not be available in hard copy, but only on compact disk. In other words, students in this course would have no option but to purchase a CD-ROM instead of a textbook or course pack.

Creating the new “book” from scratch for a web format allowed it to be fully integrated with the on-line environment. The on-line book was constructed of short, punchy, and informative web pages, none with more than a few paragraphs of text and most with multiple links to other pages. To prevent a tangled morass of links, order needed to be brought to the 200 plus web pages. The pages were laid out on a large storyboard, using a small Post-it note to represent each web page, as shown below. This board would not be available to users, but it served as a useful device to design the underlying logic of the links, which would need to be intuitive to the users.

Topics available on the web-based textbook were revealed by following links, found either on other topic pages or presented in course discussions and assignments. Since the book had no beginning (no Chapter 1) or end, students could enter at this information source at any web page and follow internal links to other related topics. They could float freely between links; the links connected to other web pages, but also to conference discussions, assignments, external links, and connections with other students, the instructor, and professionals. This non-linear method of exploring and learning followed much more closely the natural learning process discussed earlier, rather than the highly programmed sequential learning common in academics. It

represents a new way of teaching and learning that requires a rethinking of both the use of technology in the “classroom” and, more importantly, pedagogical implications.

Will on-line textbooks such as this, based on a web page format, replace hard copy textbooks? It is no more likely than “amazon.com,” the popular on-line book ordering service, replacing local book stores. Rather, there is a place for both, for they serve varying needs and audiences. But on-line textbooks should be seen as a viable teaching and learning tool for the web environment, with potential yet to be fully tapped.

Summary

On-line courses and computer simulations are not going to replace the traditional classroom and instructor-student relationship. That is not their mission. However, they can enhance education by expanding it beyond traditional boundaries. Through on-line conferencing, students from across the world are able to interact with students in the classroom. Through the use of simulations like the Rivertown Simulation, students are able to experience the impact of decisions before facing them in the reality of the outside world. Through the development of on-line textbooks, students are able to learn in a more intuitive manner.

The advantages of on-line learning can be evaluated in terms of the ease and effectiveness of its technology and delivery systems. But more important and significant in terms of teaching and learning are the pedagogical implications. In 1995, Andriole (1995) reported on Drexel University’s early experience with Asynchronous Learning Networks on the web. Student reactions were extremely positive. Ninety percent felt they had more access to the instructor than in “conventional” course delivery; 85 percent said they would take another ALN course; 80 percent indicated they did not miss class lectures; 75 percent felt they had more communication with fellow students than in conventional courses; and 75 percent felt they learned more in the ALN-based course than they expected to learn in a conventional course. Andriole concluded that an individual, self-paced learning model in an “open” environment is a powerful learning medium.

As presented by Chickering and Gamson (1987) in their paper, “Seven Principles for Good Practice in Undergraduate Education,” a good educational approach should include seven factors—student/faculty contact; cooperation among students; active learning; prompt feedback;

emphasis of time on task; communication of high expectations; and respect for diverse talents and ways of learning. The on-line method of instruction incorporates all seven factors. It can result in significant rewards for on-line faculty able to adjust and adapt to both the problems and the potential of this medium. As described by one instructor, "I have found teaching a course in this format to be astounding and, initially, unsettling. I have never felt the emotional connection to my students in other classes that I feel in this one." (Gilbert 1997)

As shown above, the potential for interaction in on-line courses is significant. By combining and co-mingling the use of on-line resources, computer conferencing, on-line simulations, and web-based textbooks, universities have never before had such opportunities for creating a rich and stimulating learning environment for their students. On-line courses should not be seen by faculty and administrators as competition to the traditional campus and its classrooms, but as a complement to them, empowering both students and instructors.

REFERENCES

- Andriole, Stephen J. 1998. "Requirements-Driven ALN Course Design, Development, Delivery & Evaluation." <http://www.aln.org/alnweb/journal/issue2/andriole.htm>
- Andriole, S.J. 1995. "Asynchronous education and training networks: Lessons learned well and in progress." <http://www.sloan.org/education/aln95.htm>
- Angelo, Thomas A. 1990. "Developing Learning Communities: Seven Promising Shifts and Seven Powerful Levers." Annual Conference of the Professional and Organizational Development Network in Higher Education. Salt Lake City, Utah. (October 19).
- Chickering, Arthur W. and Selma Gamson. 1987. "Seven Principles for Good Practice in Undergraduate Education." *The Wingspread Journal*. Vol. 9, No. 2 (June). Racine, Wisconsin: The Johnson Foundation.
- Dede, C. 1996. "Policy, themes and issues." 4p. Author summary of 1995 Testimony to the U. S. Congress.
- Gilbert, Kathleen R. 1997. "Teaching on the Internet: the World Wide Web as a Course Delivery System." http://www.ihets.org/distance_ed/fdpapers/1997/gilbert.html
- Goldsmid, C. and E. Wilson. 1980. *Passing On Sociology: The Teaching of the Discipline*. Belmont, CA: Wadsworth.
- Hall, G.F., S.F. Loucks, W.L. Rutherford and B.W. Newlove. 1975. "Levels of use of the innovation: A framework for analyzing innovation adoption." *Journal of Teacher Education*. 26(1).
- Harasim, L., S.R. Hiltz, L. Teles, and M. Turoff. 1995. *Learning networks: A field guide to teaching and learning online*. Cambridge, MA: The MIT Press.
- Jaffee, David. 1998. "Asynchronous Learning: Technology and Pedagogical Strategy In a Computer-Mediated Distance Learning Course." <http://www.newpaltz.edu/~jaffeed/esstsxx.htm>

- Lawless, K.A. and S.W. Brown. 1997. "Multimedia learning environments: Issues of learner control and navigation." *Instructional Science*. 25:117-131.
- Majors, Howard T. and Nancy M. Levenburg. 1997. "Instructional Strategies for Distance Learning Environments—Focus: Online Teaching (Internet and intranet)." Training manual from Distance Learning Dynamics. Battle Creek, Michigan.
- Mason, Robin. 1998. "Synchronous Versus Asynchronous Distance Education."
<http://www-iet.open.ac.uk/staff/robinm/syncasync.html>
- Mayher, John S., Nancy B. Lester and Gordon M. Pradl. Learning to Write/Writing to Learn. Upper Montclair, NJ: Boynton/Cook Publishers.
- McInerney, William D. 1997. "Learning to Teach Via the Internet."
http://www.ihets.org/distance_ed/fdpapers/1997/mcinerny.html
- Noble, David F. 1998. "Digital Diploma Mills: The Automation of Higher Education."
http://www.firstmonday.dk/issues/issue3_1/noble/index.html#d5.
- Papert, Seymour. 1993. *The Children's Machine: Rethinking School in the Age of the Computer*. New York: Basic Books.
- Postman, Neil. 1990. "Informing Ourselves to Death," a talk given to the German Informatics Society.
- Pugh, Sharon L. "Using case studies and collaborative computer-assisted communication to support conceptual learning in a teacher-education course on critical reading." *Educational Technology*. Vol. 33, No. 11. pp. 30-38.
- Stadsklev, R. 1974. *Handbook of Simulation Gaming in Social Education*. Pertz Directory of Noncomputer Materials, Institute of Higher Education Research and Service, University of Alabama.
- Thatcher, Donald C. "Promoting Learning Through Games and Simulations." *Simulation and Gaming*. Vol. 21, No. 3 . pp. 262-273.
- Tyler, Norman 1997. Rivertown Simulation course site. [Online].
Available: <http://www.emich.edu/public/geo/welcome.html>

Tyler, Norman 1997. Syllabus for course, Community Development and Downtown Revitalization, Eastern Michigan University.

Wydra, F.T. 1980. *Learner controlled instruction*. Englewood Cliffs, NJ: Educational Technology Publications.

Additional note: The Rivertown Simulation may be observed on the web at:

cityhallcommons.com

To observe the Web Forum discussions contact the author, Norman Tyler at:

ntyler@emich.edu.