Technology Strategies for Enhancing Learning

The challenge facing all educators is to insure that technology lives up to its promise. It will take a community of classroom teachers, Extension educators, and 4-H agents all working together to identify appropriate technology including educational web sites. Evaluation plus creative application will determine "authentic activities" that lead students from simply clicking a mouse to higher order skills and problem solving opportunities. We must all work to help evaluate information as well as contribute innovative strategies as technology is applied to true individualized learning experiences.

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Technology both tantalizes and frightens educators. We know the enormous capabilities of technology can make learning more inviting, more up-to-date, and more practical. Yet, many educators find it difficult to incorporate technology applications into classrooms and workshops.

Three different technology strategies were presented in this session. Rosemary Avery has used a web-based approach to supplement her classes. As a leader in use of technology, Rosemary shared the ways she uses the web for her students and what she has learned along the way. She also shared experiences that others can avoid.

Jane Schuchardt challenged the group to analyze the use of electronic technology as a true educational tool. Two key projects using web sites as educational tools are described.

Judy McKenna, Jan Carroll, Sue Cummings and Nancy Drennen at Colorado State University developed a process for evaluating financial education for youth web sites. Preliminary findings indicate that many financial educational web sites for young people are not delivering exciting, motivating, and educational experiences.

Introduction

There is major excitement and fear among educators relating to the rapid expansion of technology. There are numerous opportunities and cautions to consider.

Opportunities include:

Increasing individualized learning for students. Lawrence Frase warns that "advances in computers outstrip software developments, software developments outstrip educational applications, and educational applications outstrip educational theory and research." (Schank, 2000). Howard Gardner believes that computers will allow educators to both personalize lessons and offer active, hands-on learning that is tailored to student learning styles. He also warns that the Internet has no means of quality control (Gardner, 2000).

Offering students (and professors) a new way to think and communicate: Many educators are using the Web is simply a new way to give students access to materials. Alistair Fraser, a professor of meteorology at PennState (Fraser, 1999), calls this "shovelware." He argues that the Web is capable of communicating mental models of our disciplines. As in the past we relied on words, diagrams, and equations to build models, we can now offer students interactive computer visualization. Teachers and students can interact with pedagogical models to explore the behavior of the system in a way inconceivable in earlier times.

Expanded emphasis on problem solving: Cyberspace learning will allow us to abandon the idea of the classroom where the instructor drones on about what to do and does not let the student experience the learning. Rather than sit in large lecture halls, students spend more time solving problems using the same content (Pelton, 1996).

Students can learn higher level skills such as embedding learning in relevant contexts, critical thinking, goal setting, planning and self monitoring: The Web-based informal assessment can help students develop goal setting behavior, planning and self-monitoring through a cognitive behavior modification technique (Good & Brophy, 1995; Hazari & Schnorr, 1999).

<u>Cautions</u>

Validity and merit of information on Internet: More information of dubious merit appears on the Internet through wild rumors, junk science, and misinformation. People, especially those in their teens and 20s, have not learned necessary skills to seek out alternative sources and verify information. There are increased opportunities for students to turn in dishonest work. One research study indicated that people who spend just a few hours a week on the net experienced more depression and loneliness than others (Sawyer, 1999).

Concern of teachers that they can't keep up technology advances: More than 34,000 faculty members representing 378 two-year and four-year colleges and universities were surveyed by mail (McQueen, 99). Two out of three university professors surveyed said that trying to keep up with technology is stressful. Many aren't using new technology because they don't know how to use it. Most use it for email but not to enhance class presentations.

People will lose opportunities for face-to-face contact, collegiality, and community: In his book, The De-Voicing of Society: Why We Don't Talk to Each Other Anymore (1998), John Locke expresses concern that voice mail, answering machines, automatic tellers and e-mail get in the way of building trusting relationships which enhance well-being.

Isolation may result in lessened business ethics: The more isolated work is from other part's of one's social world, the more business ethics will suffer (Nie, 1999).

Students may waste time rather than use it productively: Some electronic programs can result in wasted time and more fun than meaningful learning. Many current applications do not equip students with the skills they will need for a rapidly changing future, such as creative problem-solving, communication, and human relations skills (Healy, 1999.)

<u>Using Technology to Enhance Classroom Teaching.</u>

In excess of 1,600 institutes of higher education in the U.S., in every state, and in over 70 countries around the world are engaged in collaborative online teaching and learning environments. The penetration rate of networks on college campuses in the U.S. is about 83%. In fact, approximately 48% of higher education institutions in the U.S. engage in their own online distance learning programs. Half of all college students own their own computers when they arrive on campus their first year, and statistics indicate that the average college student spends approximately 10 hours per week on line, with 18% of them spending more than 20 hours per week online. In excess of $1.5 billion was spent on online-teaching/learning in 1999 alone, and online education is predicted to be a $46 billion industry by 2005 (www.blackboard.com).

What these statistics indicate is that "net education" is a tidal wave phenomenon that will change the way in which most of us in higher education go about doing our business. Net environments will require new paradigms and models of both teaching and learning. Many of us have already made some progress toward riding this tidal wave by introducing web sites as an integral part of our teaching tools package. Having used web sites as a complement to my classroom efforts for the past six years I have come to the conclusion that, at least in the domain of on-campus, in-class teaching, web technology should be used with care and even caution in some areas. What follows documents some insights I have gained from using this technological tool in all its facets: web sites, email, chat rooms, online test taking, hyper-linked resources, list servers, etc.

<u>Advantages of web technology.</u>

Web sites are able to provide a *lively, multimedia, extended classroom experience* that allows one to lend a *personal flavor* to outside-the-classroom learning. It enhances communication among class members, student to faculty, faculty to student, and even student to student. It enhances *information access and exchange* by providing easy access to class materials, student papers, and lecture notes. It provides an additional layer of *instructor accessibility* outside the classroom, both in terms of course materials and email contact. I often call this "the 24/7" approach, any time, any place, any where. This accessibility clearly fosters *student-centered learning*. The use of hyper-linked resources on the web, such as other sites, journal articles available on line, video materials, etc., fosters *exploratory learning* on the part of students which reinforces course material and real-world applications of course concepts. The availability of on-line practice test taking encourages the *rehearsal of course material*. The ability to post grades on the web that can be accessed via a personal identification number enables students to monitor their progress in the course and the recording of grades by the instructor, giving *them security in the evaluation process*.

Disadvantages of web technology.

Over the past five years of using web technology in the classroom I have come to the conclusion that *more information does not necessarily mean more learning*. Browsing does not mean digesting course information, and I constantly battle the problem of students being immobilized by gross informational overload. Time spent browsing resources on the web often results in less time spent actually learning course material. Furthermore, I have observed a significant *reduction in critical thinking* in regard to "printed" matter. Students seem to assume that if its on the web it must be true—which is a particularly troublesome trend given that very little web content is monitored for truth or verified. In addition, making too much class-specific information available to students beforehand (lecture notes, project outlines, etc) can *discourage class attendance*---a phenomenon that will ultimately lead to marginalization of the teacher in the classroom and a *deterioration of the learning experience*. Learning can take place in many different types of mediums, but there is a special place for human contact, discourse, group dynamics, learning from others, etc., that will be missing in our halls of higher education if we continue to regard ourselves as "replaceable" with technology. Material that is not explained and discussed runs the risk of becoming *decontexturalized* and we could loose the richness of integration in the classroom. This can be averted somewhat in terms of chat rooms where material is discussed, but the medium is time consuming and does not appeal to me based on the *inefficiency* of writing, waiting for replies, etc. It also denies our young minds the opportunity to practice their oral communications skills---skills which have show no signs of becoming unimportant in this technological era, quite the contrary. Furthermore, despite the ease of communication offered through email, as a society we still have to make major strides in terms of *email etiquette*. The volume of non-essential email can get completely out of hand, email requiring lengthy replies is often better handled over the phone or in person, and the non-personal nature or the communication medium can often lead to inappropriate language, unburdening of personal feelings, and unreasonable demands. One of the strongest disadvantages of web technology for the instructor is the time investment in designing, maintaining, and updating information posted to the web. Many instructors might view this time as better spend in personal contact with students inside or outside the classroom.

Some other more general disadvantages of web technology in higher education include the expense of fully wiring and equipping college campuses, and the constant threat and expense of warding off destructive viruses and crashed servers.

Using Technology for Outreach Education

How can electronic technology, especially the World Wide Web, be used in Extension/outreach education? As new technology presents itself (e.g., radio, television, satellite videoconferencing), it is normal to be "the first" or "the best" at using it. The design of any new educational program requires answers to the basic questions first:

What is the target audience?

What is the need?

What are the learning objectives?

What educational strategy and tools can be used to move the target audience to action?

The message and audience must drive the medium used for educational delivery, not vice versa.

Without question, the World Wide Web is an excellent tool for consumers to access information. Many organizations, including the Cooperative Extension System (CES), have used the web effectively to describe themselves. For example, the USDA Cooperative State Research, Education, and Extension Service, the federal partner in the CES, clearly describes this federal agency at www.reeusda.gov.

Further, the web has been used as an information source by Extension for nationwide programs. Sometimes, the intended audience is consumers, such as with www.money2000.org. Consumers use the site to find out how to enroll in "Money2000 ™", a program designed to give participants the skills to save money and/or reduce debt. Sometimes, the intended audience is knowledge brokers, in other words, the educators themselves. For example, the Extension web site http://retireguide.fcs.uga.edu on "Retirement Income Security" is designed as a resource handbook to guide community educators doing retirement programs.

Information is a step toward education for consumers. Information by itself is not education, which demands a change in behavior by consumers. Two key projects are in the launching stage by Extension to using the web site as an educational tool. In each case, the following advantages are touted for interactive web sites:

- Immediate feedback and interaction
- Tailoring to learners needs
- Visual orientation via graphics and animation
- Rapid communication of message

- Simulates real-life situations
- Learner has sole responsibility for learning
- Learner can move at own pace
- Breaks communications barriers – all students viewed exactly the same

The first project, "Investing for Your Future: A National Extension Home Study Course," is at www.investing.rutgers.edu. This program, also offered in print format, was developed for beginning investors with small dollar amounts to invest at a time. The online version has an "Ask the Experts" feature where learners can e-mail a question to a panel of 24 personal finance experts. These questions and answers will be added to the web site in a FAQ (frequently asked questions) page where all users can learn from these queries. The outcomes (e.g., purchase one or more new investments, establish a dollar-cost averaging investment plan) will be determined upon completion of the course and several months later via two evaluation forms.

The second project, "Personal and Family Finance High School Teacher Training," uses WebCT software and is scheduled for availability in the summer of 2000. This project uses state of the art technology to develop an alternative to campus-based classroom learning for teachers. Included in the learning objectives is improved financial knowledge by the teachers themselves, and the ability to teach personal finance using the NEFE HSFPP in high schools.

This teacher training will include interactive experiences and a chat room where learners can compare notes and interact with instructors. As a result of completion of the training, teachers are expected to:
- Make a commitment to deliver the NEFE HSFPP and train other teachers.
- Improve personal financial knowledge and behaviors.
- Build skill in teaching the NEFE HSFPP.
- Use the Web to identify and evaluate resources to use in the classroom.

Until program evaluations are completed, the effectiveness of the web as an educational tool is not clearly understood. Barriers do exist – unavailability of computer hardware and software, limited computer skills, and poor marketing of a useful web site. A learner may rush in to the World Wide Web, prepared to be tantalized, only to find themselves in a tangled array of an estimated 800 million pages of electronic bits and bytes of no relevance to them.

"Bricks" (coming together in a location for face-to-face learning) will never be replaced by "clicks" (use of computer technology) for education. However, it is the responsibility of consumer educators to investigate this new method of educational delivery, try it when the match to audience and message is appropriate, and carefully evaluate it to determine its effectiveness.

Evaluating Internet Sites to Supplement Financial Education for Youth

In order to identify a research-base of appropriate web site choices to enhance financial education for youth, the researchers initiated a project to include both youth and adult evaluators. A national assessment of family economics and 4-H specialists identified close 92 potential financial education web sites.

Twenty-six web sites were selected as appropriate financial education sites for young people. The sites were checked and categorized into four categories: 1) auto buying sites; 2) multiple task sites; 3) saving and investing sites; and 4) entrepreneur sites.

Each web site was critiqued according to established criteria: design, navigability, links, content, and educational value. A checklist instrument for youth was piloted by a small group of high school students. 4-H members in Colorado, ages 14 – 18, made up the targeted panel of youth evaluators.

As an additional evaluation check, financial education experts were asked to evaluate the same web sites. The adult educators rated web sites on: authority; purpose and coverage; accuracy and validity; importance; timeliness; objectivity; and educational value.

Each of the sites was evaluated by a minimum of three young people. Most of the sites were evaluated by three adults, but not all. As a result, these findings are considered preliminary until further research is done.

Results

Two of the 26 web sites that were evaluated were no longer operational by the time the data were analyzed. Of the 24 web sites, 7 were rated high as an educational resource by youth and adults.

www.kiplinger.com/kids: This web site has a number of short pieces designed for youth (and their parents). Topics include managing student loans, teaching children how to save money, and a piggy bank calculator.

www.pathfinder.com/money: Money Magazine's web site is actually geared to adults. It does have several sources of information such as the Money 101 section and the Money/Fortune Stock Tournament that would be valuable to young people, especially if they were given a simulated youth adult identity and given a decision-making assignment.

www.cibc.com/smartstart: This web site is offered by the Canadian Imperial Bank of Commerce (which is not clear when you enter the web site). It is bright and cheerful but very elementary. The Allowance Room and Money Machine are recommended for both under age 12 and ages 13-18, which is too wide a target audience. The room where young people could select items they wished to save for was very much a boy's room.

www.themint.org: The Mint is a joint effort between the Northwestern Mutual Life Foundation and the National Council on Economic Education. It has specific exercises designed for middle school and high school students including starting a business, investing, and using credit cards.

www.yahooligans.com: This web site is trademarked by Yahoo!Inc. It is designed for kids but its home page does not suggest money management topics. Searching for "investing" did uncover a number of topic areas.

www.homefair.com: Homefair.com is a for-profit commercial site on the Internet. The content is intended to enable consumers to make more informed choices about relocation, mortgages, and related topics. Topics that might be of interest to young people (again as a youth adult simulation) include finding an apartment and finding a job.

www.quicken.com: This site is developed by the company that produces Quicken software. Checking for auto insurance quotes turned up a nonexistent page.

Overall, there is much work to be done with web sites and youth education. Few sites appear to offer solid information that is appropriately presented for young people.

References

Fraser, A. B. (1999, August 6). Colleges should tap the pedagogical potential of the world-wide web. The Chronicle of Higher Education, B8.

Gardner, H. (2000, March-April). Technology remakes the schools. The Futurist, 30-32.

Good, T. L. & Brophy, J. (1995). Contemporary educational psychology (5th ed.). New York: Holt, Rinehart and Winston.

Hazari, S. & Schnorr, D. (1999, June). Leveraging student feedback to improve teaching in web-based courses. T.H.E. Journal, 30-37.

Healy, J. M. (1999). Why slow down the rush toward school computers? The Education Digest (November 1999, www.eddigest.com)

Locke, J. L. (1998). The de-voicing of society: Why we don't talk to each other anymore. Simon & Schuster.

Nie, N. H. (1999, July). Tracking our techno-future. American Demographics, 50-52.

Pelton, J. N. (1996, November-December). Cyberlearning vs. the university: An irresistible force meets an immovable object. The Futurist, 17-20.

McQueen, A. (1999, August 30). Study: Technology leaves profs in dust. Fort Collins Coloradoan, 1.

Sawyer, D. C. (1999, February). The Pied Piper goes electronic. The Futurist, 42-46.

Schank. R. C. (January, 2000). Futurespective. A vision of education for the 21st century. T.H.E. Journal. www.thejournal.com pp. 43-49.

Endnotes
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