EDUCATION ed AT A DISTANCE

Ed at a Distance

Magazine and Ed Journal

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PODIUM

New Lamps for Old: Business Ventures in Education

Donald G. Perrin Ph.D., Editor
Education at a Distance

Educators are concerned with the efficacy of distance learning systems and their impact on pedagogy; industry has embraced distance education to accelerate learning, reduce training cost, and expedite dissemination. In business, industry, government, and the military, the decision to adopt is eminently practical and is an investment in technology to achieve logistic advantages and cost benefits. There is no comparable "investment" opportunity for education.

A Brief History

The first half of the twentieth century saw the chalkboard supplemented with filmstrips, 16mm sound films, broadcast television, and audiotape recorders. In the fifties, schools experimented with cable television and large-area television broadcasts (Midwest Program for Airborne Television). Language labs and teaching machines were the first technologies for individualized instruction.

The sixties were prolific with research and implementation: programmed instruction, single concept film-loops, Instructional Television Fixed Service (ITFS broadcast), videotape recorders, and computer assisted instruction (CAI).

Dr. Leonard Silvern used performance aids to improve productivity with step-by-step instructions on slides-and-tape. It accelerated production, reduced errors and lowered skill requirements for electronic assembly and maintenance of complex electronic systems. Dr. Gabriel Ofeish showed that CAI could reduce training cost in business, industry and military settings. Individualized learning can occur at any time during the workday, evening or weekend. As a result, it does not disrupt workflow or require persons to go off-site for training.

By the 1970s there was a substantial research base on technology-based learning. While industry reaped the economic rewards, education did not have economic resources for the new technology.

In the eighties, two-way videoconferencing used broadband telephone lines to enable learners to participate singly and in groups at multiple sites. It facilitated discussion and enabled rapid and geographically widespread communication of ideas. It saved time and travel cost with minimal intrusion on daily schedules. Satellite teleconferences were cost-effective for large and widely dispersed audiences. They enabled simultaneous training or global roll-out of new products and processes. The

teleconferences were supported with printed materials and questions by telephone provided feedback. PBS, Ti-In, and Star Schools led the way in nationwide distribution of educational programs via satellite.

In the nineties, networked computers took center stage. Graphic user interfaces popularized the Internet. Almost overnight there was access to knowledge in text and multi-media formats with a range of communication services including email, bulletin boards, chat, net-phone, and news groups. The Information Age exploded with communication that was global, interactive, and virtually instantaneous. In addition to updating their own infrastructure, government, business and industry invested heavily in computers and networks for schools and colleges to prepare them for the new millennium. As a result, any-where any-time learning is now available wherever there is an Internet connection.

Online learning integrates a broad spectrum of communication tools into an interactive network with text, images, sounds and video controlled by an easy-to-use browser interface. The same systems work on home and office computers and in schools. Communications can be open to the global community or more private than a telephone. New interactive delivery systems encompass learning management systems, testing, billing, tracking, and access to an incredible range of learning resources.

So much for the technology. It is global, ubiquitous, powerful, and inexpensive.

Adoption by Academia

Why have some academics resisted technology as a medium of communication and interaction? We live in the information age and these tools and practices are standard fare. Is it fear of failure, or fear of change? Is it economics or tradition? Resistance is fading as academic institutions adopt online learning to improve instruction, extend course offerings, serve unserved populations of students, and communicate with the academic marketplace.

The casualties of change are often those who resist it. Computers are here to stay. Courses are adopting online components and increasingly online courses are interchangeable with on campus classes and laboratories. Computers have become as essential to modern life as automobiles and telephones.

Research questions are changing from comparison of traditional vs. online courses to ways to optimize learning. Courses taught by text make minimum demands on the technology and there are many excellent examples of text-based courses that are exciting and effective. Interactive multimedia provide text, graphics, sound, and video that can be delivered online, via CD-ROM or DVD. Courses that require specialized facilities or on-site training use a hybrid format that combines online, classroom and lab.

Educational institutions can better use their available space and resources by having students learn online at home or in the workplace.

Online Training

B-I-G-M - business, industry, government and military - are rarely education focused. Their requirements are practical and immediate as in JIT or Just-In-Time training. These training materials do not need to be merchandized and promoted for internal

users in the same way as products for the open market. This is illustrated in Scenario 1 and 2 below.

Scenario 1

Several years ago I accepted a major training contract from a leading Silicon Valley company. It was a highly innovative program for clients for whom absolute reliability and instant response to problems was paramount. Cost was no object. I visualized CD-ROM to provide an array of high quality audiovisual experiences that were highly interactive. This did not fit the needs assessment.

- It had to be available simultaneously worldwide. This required it to work on any computer with a modem connection.
- It had to be printable so sales persons and engineers could carry it with them into facilities with all levels of security.
- It had to be modular so that different levels of management, sales, technical and engineering staff could receive instruction appropriate for their needs.
- It had to be certified through computer-mediated tests to ensure a high level of performance that was consistent worldwide.

The resulting product was not highly interactive - it was based on email, downloading and printing files. It was not highly visual; it used simple diagrams. It had twenty learning modules with two levels - beginning and advanced. Initial login determined the job profile of the learner and prescribed the appropriate modules and levels. Each was downloaded to a laptop computer or printer. As each module was completed, the test was taken online. Certification was issued when criterion performance was achieved on all tests. Delivery and tracking was computer managed. Thus, training for a critical and expensive program was achieved with minimal but highly reliable and proven technology. It was completed in a few months and met the requirements of management, clients, sales, and technical personnel.

Scenario 2

Oracle recently advertised how it saved a billion dollars in one year by standardizing software, databases, and human user interface so it was identical for company offices in 60 countries. This made it possible to have current data for worldwide operations to facilitate corporate planning and management. The changeover required online training so all employees could effectively use the system.

A review of existing local training showed redundancy of effort and a continual need for new and updated courses. Over time, only a small percentage of these courses continued to be used. Expensive course production was discontinued in favor of online prototype courses. Only those courses used by large numbers of employees were subjected to intensive instructional design and refinement. (There is an important lesson here. In a rapidly changing environment it is important for courses to be both functional and cost-effective.)

An instructional design template was established to ensure effective presentation and efficient learning. Users found this standard interface facilitated transition from one lesson to another.

Industry Enters Education

The new communication tools and success in training created a pool of expertise that business and industry now offer to solve the problems of education. There are partnerships and commercial ventures of various kinds funded by government, corporations, venture capitalists, and foundations. Finally education, a folk culture based on an agrarian calendar, is being impacted by technology and the information age. In a period of increasing demands and diminishing resources, technology promises to bridge the gap.

Most industry-education relationships are partnerships where both should gain in the long haul. The early stages of these relationships are tenuous as each learns to understand the other. There are illusions to be dispelled on both sides.

Industry sees education is the largest untapped market for technology. What is not apparent is that education is so grossly under-funded that it cannot make the transition without massive infusions of capital for computers, software, servers, networks, courseware, training, and maintenance. Furthermore, it will need continuing high levels of funding to support this technology. If the useful life of a computer is five years, it requires replacement of 20% of the inventory every year to maintain a viable infrastructure. The life of software and courseware may be less than this. There are also unresolved budget issues for buildings, teacher training and recruitment, salaries, and certification. College populations are expanding three times faster than funding for buildings and instruction. Legislators look to distance learning as a way to accomplish required growth without a proportionate increase in budget.

Education sees industry as an unlimited resource. The reality is that business has a bottom line that determines its ability to stay in business and its ability to attract investors. The collapse of the stock market shows that even large corporations have finite resources. And when companies don't make money, the tax base is reduced, and government revenues change from surplus to deficit.

In addition to unrealistic expectations, there are suspicions. Education is fearful of being taken over by government or for-profit enterprises. Industry is fearful that educators will not be able to meet their commitments and buy their products.

Scenario 3

This Scenario introduces new problems - different business cycles, evaluation criteria developed by committees, and change in communication protocols. Selling techniques effective in other markets may not be effective in education.

I recently worked on what promises to be the most innovative instructional program of the 21st Century. It combines computers, high quality video, and web interactivity. All of the elements were demonstrated to work reliably on state-of-the-art computers and networks. It was redesigned for delivery with a low-cost appliance. The instructional

design was templated to facilitate mass production.

Initially, the company requisitioned an independent needs assessment to know more about the education market. The company was enthused by potential success of its product and departed from the assessment to accelerate time-to-market. It is awaiting feedback from end users to "fine-tune" the product.

Unlike industry sponsored training, it is difficult in education to determine who are the clients. The student is the beneficiary but not the client. The product is designed for teachers in grades K-12. Will teachers buy it? Or administrators? Or school systems? Or a purchasing agency? The client in education is invariably a committee comprised of teachers, curriculum specialists, administrators, and a purchasing agent. Their recommendations must comply with priorities and regulations imposed by the school-district, and state and federal agencies. For example, media may require captioning or additional language tracks for students with special needs. What certifications or endorsements are needed to gain market acceptance? What funding sources can be used? Who determines funding priorities? And when does purchasing occur in relation to semesters and budget cycles?

In this instance, bureaucracy and market complexity may have a greater influence on success than quality, price or learning effectiveness. This drama has yet to be played out. The minimal technology of Scenario 1 does not apply here. Schools need interactive multimedia to teach the diversity of learners in today's classroom. The prototype products in Scenario 2 could not compete with glossy finished and tested products from publishers. Even if the product receives all of the right endorsements, there may be budget limitations. Expensive hardware may have depleted budget for software and courseware? Only the future can tell.

The Future

Partnerships between industry and education are growing in numbers. Industry has expertise and technology that is invaluable to education. Education is the preparation ground for the workforce of tomorrow. It offers expertise, research, and future employees. Schools and industry have very different motivations and *modus operandi*. Each must listen to and observe each other to be sensitive to needs and differences so they can successfully work together. Both are deeply entrenched in teaching and learning and interactive communication technologies. Their collaboration is essential to enrich the global community.

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FEATURED ARTICLES

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Editor's Note: This is a new section within Ed at a Distance Magazine. Included here will be statements - disturbing, funny, profound and evocative - from students exploring their experiences with online and technology based learning. We hope that teachers, administrators, instructional designers and other students will be as intrigued as we were by the contrast in learning experiences.

STUDENT EXCHANGE
Peer-to-Peer Asynchronous Online Learning

About Bias

Mary Holm

Posted: Sat, 23 Jun 2001 10:47

Bias can be deliberate, intentional, and discriminatory. Bias can also be naive; the influence of the country we live in, the area in which we reside, parental or teacher guidance, friends, co-workers, acquaintances, strangers, and life experiences all create our biases.

We play a significant part, however, in bias creation with acceptance or rejection of an idea. Even if ideas are a matter of conditioning, we have the responsibility to look at our biases and question them. I may add, that although questioning is a responsibility, it may not be possible at any certain time depending on exterior or interior forces. In other words, you may not be able to see it, even if it struck you in the face. Sometimes, people choose because of those around them. Sometimes, the choice is made because there seems no other option at the time.

Every person, every instance that we meet will somehow alter our bias. Think about it. Your life and the journey that you are taking, is significant, because you will influence another - and they will influence you. Perhaps it is not another, but a place, a taste, a sense of touch, a smell. We store these things in our subconscious, only to be influenced by them.

Can we choose to develop our own criteria and think differently? Yes, but we must

also face resulting consequences, after having made that commitment. Perhaps that is why people 'run with the herd.' And even if we choose to develop our own criteria, we are still influenced by subconscious bias.

If we want the biases (discriminations) of others to change, then we must think differently and become pro-active in our attempt to change their bias. But we must be certain that our pro-active idea does no harm in and of itself. We have to try and see the BIG PICTURE. How will my ideas affect others? Will these ideas cause harm? Is that 'harm' for the overall good? What is good - what is truth? Oh, oh here we go again! These questions must be raised by every individual, unless you want to be lead around by the ring that others (and yourself) have placed in your nose. Wow! What a painting!

I have learned that research is extreeeemely time consuming, and that, even using the hexadigm, will never fully realize the whole truth and nothing but. However, I bow in admiration to those people who are writing educational books because of the vastness of knowledge already written and currently being discovered. Their challenge, and ours as educators, parents, and friends is to bring as much of the truth as we can possibly acquire; to check and re-check facts, and perhaps come up with some of our own discoveries or theories for reinforcement and advancement of society.

I have also learned that the unintentional bias, as I have stated in my outline for this assignment, can be just because of the vastness of information present. What do I include? Will it be significant? Can I really include everything? (No) But I also think that using the hexadigm as a way of thinking will promote looking at a topic from a number of views, thereby reaching a greater truth.

This is a second posting of Bias and What I Have Learned.

Mary Holm

About the Author as Student

Mary Holm is an art teacher at Peonia High School and a graduate student who will be completing her Masters in Education after this course and a studio art course to be taken in the fall. This is her first web course.

Thoughts on Online Courses
Dan Ryan

Posted: 06/22/2001 3:12:04 AM

For what its worth...I just took an online course...using WEBCT is a piece of cake.... key to class success is an instructor who is willing to devote enough time to students who have some difficulty with the topic (mine was a UNIX shell prgmg course)...fortunately I had enough of a programming background to deal with the class...other students weren't so fortunate.... The teacher was VERY unresponsive...I ended up tutoring 6 students so they could pass the class...like someone noted&great interaction...but I'm not so sure so many people would take that amount of time when they are not responsible for doing so, not getting paid to do so, or don't have the time to do so...I just got so pissed off at the teacher's lack of concern that I did it.... don't want to have to do it again. I don't belong on this email list.(DEOS Listserv)..topic just hit home and I had to stick in my two cents...

Dan R

About the Author as Student

Dan Ryan has many years of business and systems data processing experience. He

holds an MBA in Computer Methodology from Baruch College, CUNY. He gave permission to use his comments in hope that "the comments might help get a message through to those who need it".

Initial Thoughts on Choosing Explanations
Kevin Mayhew

Posted: Sun, 08 Jul 2001 16:20:30 -0700

I guess the roller-coaster ride must continue! Last week I thought I was really clicking with the assignment material and this week I've been reading and re-reading the material trying to allow the light bulb to come on. Since the electricity is apparently off for the time being, I will fall back on one thing I've learned about this course: when in doubt, just start writing and trust your peer students to point you in the right direction & so here goes:

It seems that of the early schools of interpretation (I counted about 15 of them in the first two readings, not counting the framework items upon which they are built), a number of them apply directly to my topic. For example, the whole issue of Moral Criticism, involving the charges and counter-charges of ethical improprieties by Catholics and Protestants, certainly had an impact on how native people in the Americas were viewed by Europeans. The manifestations of those mindsets were most dramatic in the way in which the Spanish conquerors viewed and subjugated the natives. Traditional worldview of the Americas and their inhabitants as needing to be conquered, stripped of power and wealth, and religiously converted were just some of the results of the moralist views taken by the Spanish. The research I have done suggests that scant attention was paid to the pottery being made. The exception, of course, was when pottery (especially figurines) was adorned with some other item of "value" to the Spanish, like gold, silver, or jade.

Along with this moralist crusading by the Spanish is, in my mind, a connection to what I have labeled as Nietzsche's School of Heroic Leadership. It seems that Spanish conquerors had the mentality that the native people were "an 'inferior herd', who needed high-class, heroic leadership by a 'superman' guiding them &" (Bensusan, Foundations of the Evaluation Categories, p. 9). This mindset began with the first conquerors and at least continued through the many different Spanish court appointed Viceroys who ruled New Spain. This way of viewing the masses of natives would naturally extend to the level of recognition and value that would be placed on all facets of the culture, including the pottery. It is interesting to note, as I have stated in past posts, that many Europeans viewed Latin American art with nothing less than disdain until well into the 20th century. Again, the stigma originally attached to the entire culture seems to have lasted for many centuries.

My posts in the last assignment tended to rely on what is called the School of Biographical Criticism. I tried to interpret the writings of authors based upon some limited biographical sketch that I had pulled together. Some of that information came from the author's own words and other data was culled from my own interpretations of what the author was communicating to the reader. In both cases, however, the focus was to understand what motivated the author to produce his/her work.

Last week, many of the posts from students either hinted at or expressly stated that there was a connection to not only the world environment at the time of publication but also how the audience of the time would receive, analyze, and react to the information. I think this was all a part of what has now been labeled by Dr. B. as the School of Social Criticism. Social theory, Dr. B reports, "suggested that if an artwork was

successful, the artist must have incorporated ideas, values and stylistics which were meaningful and acceptable to the audience & " (Early Schools of Interpretation, p. 1). If that measurement were applied to pottery ware, it follows that unsuccessful artwork (as labeled by the Spanish, for example) did not appeal to the audience. But does that mean it wasn't art? Does that mean it didn't incorporate the values, ideas, and styles of the times? Wouldn't the interpretation of the native pottery creators and their customers tend to clash with those of the Spanish?

The School of Formalism, which I initially thought would come riding to the rescue of the dilemma I had with Social Criticism, failed to do so. My first thoughts were that viewing the native pottery ware from a position unblemished by social principles would let the true artistic quality and cultural significance of the work shine through. My understanding of this school of interpretation was that aesthetic principles, not social ones, would be the measuring stick. I immediately reasoned that the aesthetic principles would be those defined by the native population in which the pottery was produced. I was disheartened to see that this school was based only on the "'Classics' of Western Civilization & [and] & was not interested in the 'variants' or the 'deviants' found in [other cultures such as those in Mesoamerica]" (Bensusan, Early, p. 3).

I found some solace in Carl Jung's School of Archetypal Criticism. This interpretive school reasoned that humans are similar in that they all have individual journeys through time that bind them together. The psychological events that defined those journeys were thought to be "universal", with the understanding that the uniqueness of each person and culture could still be identified. It seems to me that this school of thought would apply to pottery production just as well as any other cultural event. First, it acknowledged that individual effort and the specifics of one's journey through life were meaningful; they counted toward the culture that one inhabited. Second, it tended to level the playing field for all people, which by extension, would apply to what they produced as human beings. And third, it formed a linkage among the various levels of social construct: fine culture (upper class), popular culture (middle class), and folk culture (rural and everybody else). This last point is important, I think, because it tends to blur the hard lines that separate those levels. This, in turn, increases the ability to view and ponder pottery, for example, without fear of ridicule and with some attention to its place in history. For example, everything from what is labeled utilitarian pottery (i.e. plates for everyday use) to fine artwork (i.e. ceremonial tomb figurines) could be viewed in terms of its place and priority in the cultural continuum.

There are other schools of thought that my topic area can be viewed from. Some of the Global and Post-Modern Schools (Cultural Relativism and Cultural Diversity) would apply, in my opinion. I notice, however, that next week's assignment calls for us to compare and contrast a number of schools of interpretation. Since that appears to be what I have been doing in this post, I think I'd better back off a bit. My thinking is that this week and next will be one big super-assignment with basically the same goal: to understand and apply to our topics the many differing perspectives that exist when people begin evaluating cultures. Your criticism of my interpretations is encouraged. Thanks.

Kevin

About the Author as Student

Kevin Mayhew is an undergraduate student in a World Perspectives online course at NAU. He is 46 years old, a Captain with the Tucson Police Department and presently assigned as a uniform patrol commander. He has taken several web classes but this is the first using this format.

Gathering Information
Donna J. Cox

Posted: Date: Tue Jun 26, 2001 14:39

I like the fact that I can work online in my nightie or go to class without make-up. The downside is that it requires a lot of keeping up and organization. Do I like it better than ITV...you bet. People express more of their feelings on the Internet and it gets rid of inhibitions. Most of my classmates in my last ITV (Interactive TV) class never even told me their names AND, if I wanted to discuss what the prof was saying, I got dirty looks.

Also, I had a student sit by me (so I could help) to explain what the prof said (the counselor suggested I help) and one of my classmates turned me in for talking too much. I whispered and the other student had a learning disorder but it didn't matter.

At least this way we can all talk and ask questions and learn from each other. I like it.

Donna Cox

About the Author as Student

Donna Cox, mother of 4 sons, grandmother of 2, and owner of 3 cats and a dog was raised "all over the world", and just returned last year from living on the island of Crete for 4 years. She is an undergraduate student working for her Bachelor of Arts in Liberal Studies. She is 56 years old and her goal is to graduate before she's 100! She states that, "This computer and web class has me terrified. So if I stumble, consider it a senior moment and help me back up - PLEASE."

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Editor's Note: This section highlights existing and proposed new partnerships and models for active collaboration between communications industries and education, local, state, or national, K-graduate school. It will reference new technologies that hold exceptional promise in meeting the needs of school and training environments. If you are working with technologies that you would like us to review for inclusion in TECHNOLOGY EDUCATION EXCHANGE, either as a manufacturer or user, please send information and press releases to the editors.

TECHNOLOGY EXCHANGE

This month's topics:

Fiber Installation Prepares Nashville Schools for Future
3M Telecom Systems Division

Distance Learning Center Saves $100,000 Annually with Web-based Scheduling Solution
Scott Steinacher - TimeTrade Systems, Inc.

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STATE EXCHANGE

State Chapters and individuals are encouraged to share information about current activities, proposed legislation, successes and caveats experienced by members of USDLA State Chapters. Readers who are not members of State or National USDLA are also encouraged to contribute.

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Englewood, CO 80111
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2001 CALENDAR

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August	Distance Learning: Research and Practice	Online	July 9	July 13
September	Distance Learning in Business and Industry	Online	August 6	August 10
October	Courses and Courseware for Training and Education	Online	September 3	September 7
November	Overview - National Trends in Distance Learning	Online	October 8	October 12
December	USDLA Annual Report and 2001 ACCOMPLISHMENTS	Online	November 5	November 9

Managing Editors:

Drs. Elizabeth and Donald Perrin
3345 Pachappa Hill
Riverside, CA 92506

eperrin@pacbell.net Cell: 909-236-2658

Please direct inquiries concerning articles for submission to Drs. Elizabeth and Donald Perrin.

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CALL FOR PAPERS

Education at a Distance is a refereed publication of the United States Distance Learning Association. It focuses on distance and open learning and their integration into education and training worldwide. Specific topics include: research, innovations in teaching and learning theory and practice, curriculum design, distance-learning, administration of distance education, technology, legislation, policy frameworks and analyses, institutional change, and education-industry partnerships.

Education at a Distance is published online monthly. An interdisciplinary panel specializing in distance education will review all submissions.

Submission of Articles

Length: Article submissions are usually from 2,000 to 5,000 words in length. However, articles of 12,000 words or more will be published when the topic and treatment merit it.

Format: Papers should conform to APA standards. Please include a brief biography of the author or authors, mailing addresses, and email/phone contact numbers.

Copyright Clearance: If you include any materials that require copyright clearance or permissions, please provide source and email address of contact persons.

Word Processing: Word, Rich Text Format (.RTF) or ASCII Text are preferred. Attach files to email or send as a diskette with one laser-printed copy.

Graphics: Where relevant, include files of photos, line illustrations, charts, and as email attachments or on diskette. .GIF or .JPG files are preferred, but we can convert from most Adobe and Microsoft graphic formats.

Contact Info:

Please direct inquiries concerning articles for submission as follows:

Drs. Donald & Elizabeth Perrin, Managing Editors
USDLA Education at a Distance
3345 Pachappa Hill Riverside, CA 92506

Voice: (909) 369-4059
FAX: (909) 779-0803
Cellular: (909) 236-2658
EMAIL: eperrin@pacbell.net or dperrin@pacbell.net

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Editor's Note: Dr. Curtis Bonk is prolific in research and writing. Some of his recent reports may be found at http://www.courseshare.com/reports.php. Research is important to answer questions about methodology and how students learn. Dr. Bonk and his team of researchers explore what works and how well it works online - in short, how can we make learning more effective? Conferencing On the Web (COW) confronts important questions about learning, instruction, mentoring, and peer learning on the Web for pre-service teachers. Many of these findings can be generalized to other student groups and other subject matter. In their conclusions, the authors elaborate on how these findings were used to improve future classes.

HOLY COW: SCAFFOLDING CASE-BASED CONFERENCING ON THE WEB WITH
PRE-SERVICE TEACHERS

Curtis J. Bonk, Charoula Angeli, Steve R. Malikowski, and Lauren Supplee

Abstract

This study explored how to use the Web to foster collaboration and interaction among pre-service teachers in undergraduate educational psychology. These pre-service teachers conversed electronically with peers, mentors, and instructors on the Web about cases related to their early field experiences using an asynchronous conferencing tool called Conferencing on the Web (COW). Whereas earlier research compared levels of scaffolding on student generation and discussion of cases in COW within specific time periods, this particular study allowed longer amounts of time for students to post and discuss cases. In addition, there was more qualitative data collected here than in the previous study. The 157 student participants in this study produced 319 cases during the conference with 620 peer replies and 298 mentor replies. Students submitted the majority of their cases to the secondary-school conference, while less than ten percent of the cases were submitted to the general-case conference. In effect, they failed to perceive the generalizability of their field experiences. Students received on average about three peer or mentor comments on their cases. Transcript analyses from 75 randomly selected cases indicated that students failed to justify most of their comments. In addition, peer feedback was extremely conversational and opinionated. Conversely, instructor mentoring was focused on high level questioning, providing examples, and case specific feedback. While data from student interviews and evaluative surveys on their electronic conferencing experience were mixed, students who experienced this activity as part of an entire Web-based course claimed more benefits.

Scaffolding Case-Based Conferencing on the Web With Pre-service Teachers

The past decade has been an exciting period for building cognitive apprenticeships

with electronic learning tools. The power of asynchronous conferencing tools to facilitate college student reflection on field experiences and internships is without precedence (Bonk & King, 1998). Technology tools can now bind students, peers, mentors, instructors, practicing teachers, and experts in an array of resources, discussions, and curriculum recommendations. There are daily advances in tools to foster student generation of ideas, collaboration, and knowledge integration and evaluation. Unfortunately, there is minimal guidance as to their pedagogical significance and scant research to make firm claims as to how teacher educators might use such technology. In fact, there is growing recognition that the field of computer-supported collaboration learning (CSCL) lacks clear theoretical housing (Koschmann, 1994).

It is hard to discount the fact that various technologies are transforming the formats of teaching and learning in most higher education and public school settings (Bonk, Hara, Dennen, Malikowski, & Supplee, 2000; Bonk, Kirkley, Hara, & Dennen 2001). The generation of computing networks to support live and delayed group collaboration has fortuitously paralleled the emergence of models and techniques for promoting cooperative learning and collaborative work in schools (Blumenfeld, Marx, Soloway, & Krajcik, 1996). Many questions remain, however, related to whether such tools for collaboration and communication have increased student access to education and resulting learning (Owston, 1997). Do unique student interactions and rich discussion threads increase student learning and comprehension? Does greater access to resources and the ability to browse instructional materials from multiple locations lead to more highly linked and accessible knowledge structures? Equally important, how does communication with students from other locales and countries enhance student perspective taking abilities and ensuing attitudes and beliefs about the rest of the world (Bonk, Appelman, & Hay, 1996; Windschitl, 1998)? As new learning technologies emerge, informed researchers, talented teachers, and innovative instructional designers must find new paths for their creative use.

Electronic Cases in Teacher Education

This particular study combines the recent movement toward apprenticing students in more meaningful and authentic learning environments (Lave & Wenger, 1991) with teacher education research highlighting the importance of case-based reasoning (Lundeberg, Levin, & Harrington, 1999; Kowalski, Weaver, & Henson, 1994, Shulman, 1991; Silverman, Welty, & Lyon, 1992). While aspects of each area are elaborated below, more thorough reviews of each topic can be found in Bonk, Hansen, Grabner, Lazar, and Mirabelli (1998) and Bonk, Malikowski, Angeli, and East (1998).

Case-based learning emphasizes the importance of realistic or authentic learning settings. More authentic problems can serve to anchor instruction in complex events that rely on the application of course concepts and principles for their resolution (Williams, 1992). It is the application of concepts to real world events that make this learning format appealing. Important to this particular study, many teacher education researchers point to the utility of cases for distinguishing expert and novice teacher performance, and, simultaneously, moving preservice teachers down the road to teaching expertise (Barnett, 1991; Livingston & Borko, 1989; Westerman, 1991). Other researchers have begun to discuss and illustrate how technologies might be employed to create reusable cases that preservice teachers can reflect on, discuss, debate, and evaluate (Admiraal, Lockhorst, Wubbels, Korthagen, & Veen, 1997; Bonk, Hansen, et al., 1998; Bonk, Hara, et al., 2000; Bonk, Malikowski, et al., 1998; Copeland, 1989; Merseth, 1991). Some of these technology innovations and

pedagogical strategies focus on ways to reduce the relative isolation students teachers often feel by discussing field experiences in the form of electronic problem cases and success stories. Other novel technology applications in teacher education focus on typical teaching and learning environments and problems before students head to the field. In either situation, the goal is the professionalization of teacher education programs and the preparation of more skilled and competent teachers.

Web-based collaboration and learning tools, for instance, can offer an assortment of richly textured cases in accessible, expedient, visually interactive, broad, diverse, and cheap formats. In fact, there are plenty of opportunities available to college instructors wanting to apprentice students in the teaching profession with cases (Riesbeck, 1996). For instance, some Web support sites for teaching education courses contain simulations embedded with realistic student records and images, expert commenting, personalized feedback mechanisms, and other key instructional help and task structuring.

Sociocultural Underpinnings of Electronic Environments

As such electronic learning environments emerge for apprenticing teachers and other professionals, educators have increasingly found socio-cultural theory attractive for explaining how student learning and development unfolds in these environments (Bonk & Cunningham, 1998). In fact, Bonk and Kim (1998) detail how socio-cultural theory can be applied in adult learning settings. For instance, Vygotsky's (1986) arguments about the benefits of learning in a social context certainly have applicability in Web-based conferencing in higher-education environments. When students engage in social interaction and discourse about real world teaching and learning settings, such as electronic case conferencing about field experiences, they are exposed to the strategies and skills of peers and mentors which should help them internalize new competencies (Brown, Collins, & Duguid, 1989).

One key socio-cultural principle, the zone of proximal development (ZPD), relates to finding ways for experts and more capable peers to assist student learning and problem solving beyond their independent reach. In effect, the ZPD represents the area between the student's actual or unassisted performance on a task and his/her performance when provided with outside support or guidance (Wertsch, 1985). When students debate the cases they create, they are simultaneously constructing new knowledge and debating issues at the edge of their ZPDs. And with asynchronous electronic systems, opportunities for advice and interactive scaffolding within student ZPDs can come from distant experts and peers as well as from students within one's cohort.

While students might debate and negotiate ideas electronically, mentors, experts, and instructors can offer encouragement, modeling, feedback, questioning, and task structuring that can be adjusted based on perceived student competence (Bonk & Kim, 1998; Collins, Brown, & Newman, 1989; Palincsar & Brown, 1984; Tharp, 1993). Such interactive thinking and learning in a social context is intended to expose students to alternative teaching strategies and contextual cues. In effect, with such electronic discussions, preservice teachers no longer just observe practicing teachers, but now they also reflect on their performances while obtaining electronic feedback from other teachers, adult learning guides, and their peers.

Related to these ideas about negotiation of meaning within students' ZPDs, is the notion of an electronic cognitive apprenticeship (Levin & Waugh, 1998; Teles, 1993).

In a cognitive apprenticeship, the goal is to move the learner from a newcomer to more expert-like status by first participating in the community periphery and then taking on a more central role within it (Lave & Wenger, 1991; Rogoff, 1990). Experts, practitioners, and mentors in this environment gradually transfer responsibility for the learning task to the novice learner as they internalize greater skill and knowledge of the discipline (Brown et al., 1989). In the present study, expert-student and student-student electronic interaction about case problems and success stories at the beginning of teacher education programs is an important form of scaffolded learning. As such, most of the research questions below stem from this socio-cultural perspective.

Research Questions

As indicated, this project extends our work on electronic case-based conferencing among pre-service teachers about their early-field experiences. It investigates whether more open-ended forums with designated online case conferences for elementary, secondary, all grades, and general cases could foster more critical thinking and social interaction than forums that last a shorter time period (i.e., two or three weeks). It also examines the extent to which an open-ended forum can viably support a learning community and not simply participation for the purpose of satisfying a course requirement. We expected that greater numbers of students in the conference would create more opportunities to see common problems across school sites and grade levels, thereby increasing possibilities for generalization. As in previous studies, depth of dialogue, peer responsiveness, case thread length, and forms of mentor assistance were key factors of interest. More specifically, this research addresses the following questions:

- **Case Creation and Discussion:** What conference areas and topics promote the creation of cases and case discussions? What is the average amount of case feedback?

- **Dialogue Content:** What instructional and cognitive acts are exhibited in the case discussions (e.g., questions, social acknowledgments, justified opinions, unjustified statements, case summaries, mentor feedback, peer responsiveness, off-task behaviors, etc.)?

- **Dialogue Depth:**What is the average length of response and dialogue thread? What topics or domains spur discussion? What types of questions or prompts extend the dialogue? How does peer responsiveness affect the depth of dialogue?

- **Critical Thinking and Course Linkages:** Will students justify or back up their electronic statements and claims with references to classroom resources? If so, how?

- **Scaffolding and Apprenticeship:** What types of scaffolding and learning assistance (e.g., feedback) do peers and expert mentors provide in Web-based conferences? What are the indicators of effective Web mentoring? How might apprenticeship be captured electronically?

- **Attitudes:** What are students' attitudes toward using computer conferencing and this particular tool (i.e., COW) within their early field experiences? Do they feel that COW fostered mentoring and support of their ideas? Will students claim that they have learned the material better and feel less isolated when in the field?

What aspects of the conferencing tool or task did they feel fostered a sense of learning community and general learning accomplishments?

Method

Purpose

This study was the third in a series of studies on the effects of electronic case-based learning on preservice teacher education. The first investigation revealed that asynchronous or delayed case discussions foster greater depth of dialogue and peer interaction than synchronous or real-time communication (Bonk, et al., 1998). In the second study, we found that varying the amount of electronic scaffolding and feedback did not have an impact on case quality or student dialogue (Bonk, Malikowski, et al., 1998). While students noted that the conferencing tools were extremely easy to use and hundreds of cases were created within a few weeks of the semester, student electronic comments and ideas were not backed up with critical thinking and justified reasoning. In both studies, however, asynchronous feedback was extensive and students were highly focused on case resolutions and suggestions.

As with our previous work, in the present study, we were curious how undergraduate educational psychology students might make use of Web conferencing tools to discuss the problems and success stories they see in public schools during their early field experiences. Just how might electronic learning tools be used to apprentice students into their discipline? The more specific purpose of this third study, however, was to determine if open-ended learning environments that encouraged students to engage in critical thinking could foster a greater degree of course connections and higher quality discourse. To begin to answer these questions, qualitative measures, such as student interviews, were employed here.

Participants

All teacher education students who participated in the study during the fall of 1997 were enrolled in a 20-hour early-field experience, a three-credit psychology course, and a one-credit laboratory for linking their early field experiences to the course. The students who participated in the study were enrolled in six different sections of the same psychology course. In their early field experiences, students observed and occasionally assisted a teacher, typically in their chosen major. The Web experience, therefore, was meant to foster links between their fieldwork and class experiences.

There were 157 participants, including 67 elementary majors, 74 secondary majors, and 16 all-grades (PE, music, art, special education) majors. Students engaged in the case conferencing as part of their course requirements. Mentoring on their cases was received from five associate instructors, the course supervisor, the early-field experience director, two conference moderators, and two practicing teachers. Mentors used twelve forms of electronic learning assistance as a guide for responding to the students (see Table 1).

Table 1. Twelve forms of electronic learning mentoring and assistance

(Bonk & Kim, 1998; Tharp, 1993)

1. **Social (and cognitive) Acknowledgement:** "Hello...," "I agree with everything said so far...," "Wow, what a case...," "This case certainly has provoked a lot of discussion...," "Glad you could join us..."
2. **Questioning:** "What is the name of this concept...?," "Another reason for this might be...?," "An example of this is...," "In contrast to this might be...,""What else might be important here...?," "Who can tell me....?," "How might the teacher..?." "What is the real problem here...?," "How is this related to...?," "Can you justify this?"
3. **Direct Instruction:** "I think in class we mentioned that...," Chapter 'X' talks about...," "Remember back to the first week of the semester when we went over 'X' which indicated that..."
4. **Modeling/Examples:** "I think I solved this sort of problem once when I...," "Remember that video we saw on 'X' wherein 'Y' decided to...," "Doesn't 'X' give insight into this problem in case 'Z' when he/she said..."
5. **Feedback/Praise:** "Wow, I'm impressed...," "That shows real insight into...," "Are you sure you have considered...," "Thanks for responding to 'X'...," "I have yet to see you or anyone mention..."
6. **Cognitive Task Structuring:** "You know, the task asks you to do...," "Ok, as was required, you should now summarize the peer responses that you have received...," "How might the textbook authors have solved this case."
7. **Cognitive Elaborations/Explanations:** "Provide more information here that explains your rationale," "Please clarify what you mean by...," "I'm just not sure what you mean by...," "Please evaluate this solution a little more carefully."
8. **Push to Explore:** "You might want to write to Dr. 'XYZ' for...," "You might want to do an ERIC search on this topic...," "Perhaps there is a URL on the Web that addresses this topic..."
9. **Fostering Reflection/Self Awareness:** "Restate again what the teacher did here," "How have you seen this before?," "When you took over this class, what was the first thing you did?," "Describe how your teaching philosophy will vary from this...," "How might an expert teacher handle this situation?"
10. **Encouraging Articulation/Dialogue Prompting:** "What was the problem solving process the teacher faced here?," "Does anyone have a counterpoint or alternative to this situation?," "Can someone give me three good reasons why...," "It still seems like something is missing here, I just can't put my finger on it."
11. **General Advice/Scaffolding/Suggestions:** "If I were in her shoes, I would...," "Perhaps I would think twice about putting these kids...," "I know that I would first...," "How totally ridiculous this all is; certainly the teacher should be able to provide some..."
12. **Management (via private e-mail or discussion):** "Don't just criticize....please be sincere when you respond to your peers," "If you had put your case in on time, you would have gotten more feedback." "If you do this again, we will have to take away your privileges."

Conferencing on the Web

With asynchronous Web-based conferencing, students can discuss case topics and issues at their own leisure. As indicated, the Web-based conferencing tool employed here was *Conferencing on the Web* or "COW." COW is organized into three different levels. At the base level is the "*conference*" level. In this study, we had four

conferences - one for elementary education cases, one for secondary education cases, one for all-grades cases, and one for general cases or "cases for everybody" (e.g., assessment, behavior management, diversity, motivation, and multiple intelligences cases) (see Appendix A for details on the latter one). Our experience from previous studies has shown that too often preservice teachers narrow their focus to only content and issues that are explicitly linked to their area of study (Bonk, Hansen, et al., 1998; Bonk, Malikowski, et al., 1998). Therefore, the general-case conference was created to encourage students to generalize case situations and resolutions across various educational settings. In addition, this conference contained a cafe for more informal and social discussions. COW conferences can be public (i.e., needing only a site address or locator number) or private (i.e., needing permission of the conference moderator or "fair witness" to view). This conference was a private one.

At the second level of COW, each conference is organized into "*topics*" (e.g., lecture-based questions or issues such as "Learning Styles, "Individual Differences," "Science Education," or "Bilingual Education"). Topics are typically listed at the bottom of the conference main page (see Appendix A) and were selected based on the instructor's perceived needs as well as records of topic use and discussion from previous semesters. For instance, a topic called "Your Own Topics" was somewhat popular during the previous semester and thus was added to each one of the four conferences used in this study. This topic was intended to foster greater student autonomy and ownership in the case discussion.

At the third level of COW are "*conversations*" (e.g., "Challenging talented students," "Fights in the hallway," or "Cooperative learning can work.?!"). A listing of conversations within each topic can be found by clicking on the respective topic name (see Appendix B). In this study, conversations were initiated with student postings of a case problem or situation (see Appendix C for a sample case conversation thread). Students started conversations by clicking on the "Start New" button and entering their case problem or success story. Students replied to conversations at this third level by entering comments at the end of a discussion thread. The conversation level, naturally, was where the interaction among participants occurred. COW fostered student interactivity and choice by enabling participants to browse or read new posts or all posts, while also permitting anyone in the conference to create or reply to conversations.

Students accessed COW by typing in the appropriate URL (i.e., *http://cowbonk.educ.indiana.edu/COW/*), username, password, and then entered one of the four conferences listed in their "Hot List." All four conferences were cross-linked enabling participants to easily move from one conference level to another without having to be at their Hot List page. Upon entering a conference (e.g., elementary education), they saw a list of course related topics (e.g., Topic 133: Elementary Physical Education Cases, Topic 134: Elementary Education Math Cases) awaiting their use. Any conversation started or response posted was time and date stamped along with the contributor's username, thereby providing some student accountability and system tracking of which conferences and topics were popular. In addition, online help to use the COW tool was available in any of these conferences upon demand. For instance, students could request help about how to start new messages, show all conversations posted on a topic, search for a post, hide embarrassing comments, read only unread messages, or post messages using HTML code (see Bonk, Malikowski, et al. (1998) for more details).

Procedures

The COW conference was open from October 1, 1997 to December 6, 1997 [1]. Students accessed this conference with a personal username and password. Students in every section were provided with a fifty-minute training session in late September or early October. At the training session, students learned about important COW conferencing features (e.g., how to use the reply button, show all conversations, add personal profiles, start new conversations or cases, etc.). In addition, students had opportunities to electronically read and discuss sample cases on assessment as well as change their personal profiles. These training sessions helped guarantee that students had clearance to access the system and knew how to do so. During these sessions, students noted that COW was extremely easy to use.

In regards to how students were instructed to use COW, one pedagogical task was used to structure the activity. Students were asked to create two cases during the COW project and respond to 6-8 of their peers. In addition, they were asked to summarize their case discussion thread near the end of the semester. Within their cases, students were to either detail a teacher and/or student in some sort of problematic situation or to describe an instructionally interesting success story in a school they had visited. In either case, they were asked to relate their situation to their educational psychology text material, while keeping all names and places anonymous. Students were also asked to compare the instructor's actions, if applicable, to what they might have done. Finally, they were to ask for help related to the problem situation. We asked students to conduct roughly half of this work in October and half in November.

Measures

We employed four distinct measures of student learning and conference effectiveness. First of all, since all case discussions and conferencing activities were saved and archived for in-depth analyses, summary data as well as specific case discussions were printed out after the conferences ended. The summary data helped determine the raw number of cases posted on the Web within these four conferences, the number of mentor and peer responses to these cases, the average length of post, and conferences and topics of most intense commenting. Second, from these aggregate data, a sample of 75 case discussion threads were randomly selected and analyzed for dialogue content, discussion quality, and forms of mentoring. Exemplary comments, interactions, and interaction patterns were noted during this detailed analysis. Third, at the end of the conferencing activity, most of the students completed a ten-minute survey of their attitudes toward the conferencing activity (see Table 2). Fourth, some students checked off an item on the survey that indicated their willingness to be interviewed. Three months later, eight students were interviewed for 30-60 minute about the COW case conferencing activity (see Table 3). In summary, as evidenced by these four measures, there was a combination of quantitative and qualitative measures employed here (for additional information on such collaborative tool research methodologies, see Bonk and Wisher, 2000).

Table 2. COW Survey Questions

In using COW, I gained an appreciation for other opinions. __Yes __No

Please circle the most appropriate answer:

1. How much experience did you have using the Web before this class?

2. How much experience did you have using a Bulletin Board System (BBS), Chat, or Electronic Conferencing System?
3. How many hours from October 1 - December 1 on average did you spend per week on COW?
4. How many hours in total did you spend creating and responding to cases in COW this semester?
5. What time of the day did you generally work on COW?
6. When were you most active in COW?

A. Structured Questions (Rate on a Scale of **1** (Low/Strongly Disagree) to **10** (High/Strongly Agree)

1. This conferencing system (i.e., COW) was easy to use. __
2. I received mentoring and support from others in my COW postings. __
3. COW fostered peer-interaction and dialogue about real life teaching problems. __
4. My knowledge connections to educational psychology increased from the conferencing activity. __
5. I felt more personally connected to IU when in the field (i.e., less lonely and isolated), since I knew I could talk to others about it later on in COW. __
6. I'd recommend electronic conferencing for preservice teacher professional development. __
7. This conferencing activity gave me some ideas regarding effective teaching and learning. __
8. This conferencing activity fostered my generation of ideas and creativity. __
9. This conferencing activity fostered my evaluation of ideas and critical thinking. __
10. This conferencing activity fostered a sense of collaborative learning community. __

B. Open-Ended Questions:

1. What specific experiences of this electronic activity were most and least valuable?
2. What did you gain from reading ongoing conversation threads, if anything?
3. What types of topics, domain areas, or discussion threads spurred the most discussion?
4. What forms of learning assistance and support did you receive (e.g., questioning, hints)? What were the better types of assistance in COW?
5. What kinds of electronic replies (e.g., agreements, opinions, negative feedback counterexamples, new connections/ideas, off-task commenting, etc.) did you get in regards to your case(s)?
6. Did your peers give you much feedback? If so, what was it and how did it help? If not, what could be done to elicit more feedback?
7. Can conferencing tasks and tools foster new expectations of teaching and learning? How? What learning or developmental theory was especially applicable here?
8. How can such a conferencing tool contribute to the professional development of

preservice and licensed teachers? Feel free to suggest any idea that comes to mind, even if you think it may sound too expensive or very silly.

Table 3. Online Discussion Interview Questions

1. What do you first think of as you remember the online discussions?
2. What can you remember about the case or cases you posted?
3. What can you remember about the case or cases that others posted?
4. What did you gain from observing ongoing conversation threads?
5. What features of the conferencing system were most/least helpful? (e.g., private topics, lean user-interface, search function)?
6. What type of task structuring and prompting did the conference coordinators, teachers in the field, and IU instructors provide to students to promote their use of the system? What were the best forms of support that you saw here?
7. What types of topics, domain areas, or discussion threads spur the most discussion?
8. How does peer responsiveness affect the depth of dialogue in computer conferencing?
9. Do you think there would be variations in the dialogue for students in field experiences outside Indiana, in other countries, or in different majors?
10. How is intersubjectivity or common knowledge displayed in electronic conferencing activities such as this one? How could this be fostered?
11. What specific experiences of this electronic activity were most and least valuable?
12. Are there new Internet tools that you think would foster new expectations of teaching and learning? How?
13. What learning or developmental theory was especially applicable here? Behavioral, Social-Learning, Cognitive-Information Processing, Constructivist or Social Constructivist?
14. How do these conferencing tools contribute to the professional development of preservice and inservice teachers?
15. Look at postings. What concepts from the class are embedded in there?
16. Is there anything you would like removed (from the tape recording of this interview)?

Quantitative Analyses and Results

Computer Log Data

As with most conferencing tools, COW automatically provided extensive empirical data regarding system usage. This information included:

- The number of people who accessed the system and actively contributed;
- The overall number of messages and average length of messages posted to COW;
- The number and length of responses; and
- The average length of case threads.

The COW conference was open from October 1997 to the beginning of December 1997. System data indicated that the 170 student participants in this study produced

319 cases during the conference with 620 peer replies and 298 mentor (i.e., practicing teacher, field experience director, and instructor) replies. Students received on average about three peer or mentor comments on their cases. The overall average post was around 130 words.

While students could classify these cases at the elementary, secondary, all grade, or general levels, more than fifty percent of the cases created were at the secondary level, thirty percent at the elementary level, and ten percent at the all-grades level, thereby leaving less than ten percent of the online activity as general cases. While specific topics were created for student conversation (i.e., motivation, special education), more than a third of the cases generated were submitted to the "Your Own Topics" category. Thus, it was apparent that students had difficulty perceiving how what they viewed in the field related to course content. In addition to these measures, the survey question responses provided additional information regarding student attitudes toward the electronic conference activity.

Survey Results

A survey of 139 participating students indicated that most of them had some experience with the Web and conferencing systems or chat tools prior to the semester. According to the survey data, most students spent a couple of hours per week in COW during the project and did their postings at various times, though most often between 6 pm and midnight. Because one of the six sections was operating entirely on the Web (referred to as the Web class from now on), student survey responses were analyzed with and without the answers and opinions of the Web-only students. The Web class had twenty students (one failed to complete the survey) as follows: two elementary majors, three secondary majors, and 15 all-grades majors (mostly music majors).

When the 19 Web-class students were excluded, there were 110 remaining student surveys, representing 50 elementary, 1 all-grades, and 59 secondary students. Of these students, over 70 percent were females. In addition, 60 percent were sophomores while an additional 30 percent were juniors. Nearly three-fourths felt that COW helped them gain an appreciation for the opinion of others.

Of the ten structured survey items, only three were found to be significant. First of all, as in the previous study (Bonk, Malikowski, et al., 1998), on a scale of 1 (low/strongly disagree) to 10 (high/strongly agree), students found the COW conferencing system to be easy to use ($t(109) = 6.02$, $p < .01$; $X = 7.13$, $SD = 2.83$). In addition, these students felt that COW fostered dialogue and peer interaction about teaching-related problems they would later face in their profession ($t(109)) = 5.54$, $p < .01$; $X = 6.8$, $SD = 2.59$). However, they unfortunately did not feel less isolated and lonely as a result of the COW conferencing when observing in the field ($t(108) = -5.51$; $p < .01$; $X = 4.06$, $SD = 2.77$). These results held when the Web class students were added to these analyses. However, as a separate group, the Web class students´ attitudes on the survey were significantly more positive on 8 of the 10 measures (all at the $p < .01$ level, except item #2, $p < .05$). Only items four and five failed to reach significance.

Qualitative Analyses and Results

Open-Ended Survey Questions

As indicated, this investigation combined qualitative and quantitative measures in building a chain of evidence about the collaborative formats and interaction patterns

that facilitate student learning and reflection on the Web. For instance, as in the previous study, student responses to open-ended questions about experiences with COW were mixed. Two evaluators analyzed the comments and noted common themes. They discovered that the responses from the students who only used COW for the case activity were in stark contrast to those who used COW throughout the semester as part of an undergraduate Web course. While many of the students argued that they gained nothing from the experience and did not like another course requirement, those who had cases integrated into the Web course found the activity extremely interesting and worthwhile. The Web course students enjoyed additional participation and interaction on the Web. Not surprisingly, these Web-experienced students were not afraid to offer alternative points of view or boldly state their opinions. In addition, students in the Web class, mentioned repeatedly, that they found the candid and honest feedback they received from peers and instructors to be extremely helpful and somewhat surprising.

The students who only participated in the conferencing activity to satisfy a course requirement had mixed feelings. While these students argued that the COW case activity offered novel ideas for similar problems and new ways for viewing problems, many of them claimed that they learned nothing from reading the case threads or mentioned that they were disappointed with the minimal feedback they had received. One student, however, made an interesting comment that while students were exposed to a diverse array of teaching styles and practices, the creation and use of this huge Web-case database made him aware of the importance of teacher training in the United States. Specifically, he came to the conclusion that "there's lots of incompetent teachers out there!"

There were many similarities across those in the Web only and traditional classes. For instance, both groups seemed to highly value the online comments they received from the instructors and mentors. In addition, they both noted that controversial situations, unusual problems, and outrageous issues (e.g., abuse, drugs, paddling), spurred the most interaction and involvement. Along these same lines, motivational and disciplinary situations were of high interest across all students surveyed.

Students mentioned some concepts from the course in their responses to whether the course fostered new expectations of teaching and learning. As indicated, many students appreciated the ease to which a wide range of ideas could be exchanged in COW. Some of the students, in fact, mentioned how they came to appreciate Vygotskian types of learning environments since they incorporated the ideas of others and facilitated cooperative learning and the sharing of ideas. One student summed up this viewpoint by arguing, "The way we all respond to each other, it kind of introduced scaffolding...since we were helping each other learn in our ZPD."

Though there was some disagreement, students generally felt that conferencing tools can contribute to the professional development of preservice teachers. Students mentioned that these tools helped them expand and share ideas, find solutions, and learn from others. A couple of students hedged their comments by noting that the system might work best for those with genuine problems or who were further along in their teaching careers. Among the more interesting student comments were notions that these tools would offer an option to the teacher's lounge or break-room for discussion of typical classroom dilemmas. In addition, a couple of insightful students replied that with collaborative technologies teachers all over the world could be linked together to discuss issues beyond their own schools. One student stated that "(the Web) could create a mentor or support system, especially for new teachers who lack experience." Another student noted that she "would like to see this networked (system) for teachers all over the nation...to get more experienced teachers' ideas and thoughts in real life situations." Still another added, "Computers are our future. This is a great program." In

summary, then, despite the varied feedback, the surveys clearly indicated many benefits of the online case learning activity in COW.

Transcript Results

In addition to the surveys, seventy-five student electronic case-transcript conversations were coded for discourse type, case components, question type, and the forms of learning assistance and mentoring. These cases, purposely representing a wide range of discussion and response depth, were chosen for content analysis. The content analysis scheme recorded the following forms of electronic discourse: (a) social acknowledgments, (b) unsupported claims and opinions, (c) justified comments, (d) questions and dialogue extension prompts, and (e) mentor scaffolding (see Bonk, Malikowski, et al., 1998, for dialogue-coding scheme). We were particularly interested in student justification of ideas and unique course connections.

The content of the dialogue was also of particular interest. In a stratified random sample, seventy-five electronic case discussions, representing about 23.5 percent of the discussion threads, were selected for in-depth analysis. While one person familiar with conferencing scoring schemes rated all of these cases, another rater scored a random set of fifteen different cases, or about 20 percent of the total cases selected. Inter-rater reliability between the first rater and the second rater was 80.3 percent.

A log of the transcript analyses clearly illustrated that peer feedback was dominated by unsupported claims (60 percent of the dialogue) and social acknowledgments (31 percent of the dialogue). Unfortunately, justified opinions and claims were embedded in only 7 percent of coded comments, while dialogue extension prompts and questions (e.g., "This is surely an interesting case. What do the rest of you say?"), were also rare (2 percent). Despite these problems and the social and conversational tone of the conferences, student off-task behaviors were essentially nonexistent. Instead, students were extremely focused on helping each other solve their particular dilemma(s). Similar findings were reported in Bonk, Malikowski, et al. (1998).

The transcripts also contained mentor postings. As expected, the expert mentoring from instructors and practicing teachers was more pedagogically focused and diverse than the peer comments. On average, in the 75 cases analyzed as well as dozens of other cases surveyed, there was typically at least one message from mentors in each case thread. Twenty percent of the mentor responses were in the form of indirect questioning and scaffolding ("...what does the textbook say might be a result?" "What does your text say about the strengths and weaknesses of such an approach?"), while another twenty-four percent of the commenting was devoted to feedback, praise, and social acknowledgment of the case (e.g., "Sarah, that's another interesting case."). Most of the remaining percent of the mentor dialogue was devoted to general suggestions and advice (24 percent) (e.g., "Good plans tend to help as well as...") or modeling and providing examples (16 percent). Mentors less often relied on direct instruction (4 percent), low-level or fact-related questioning, (8 percent), and cognitive explanations or elaborations (4 percent). Student reactions to this mentoring are discussed in the next section.

Interview Results

From a pool of sixteen volunteer students, eight students were randomly selected for separate interviews using the questions in Table 3. Of these, five were from the Web class and three were from the other five participating psychology sections. Of these students, seven were females and one was male. All were traditional students majoring

in teacher education. Each interview lasted between forty and sixty minutes.

The interviews occurred approximately three months after the subjects completed the online case discussions in COW. The interview questions were designed to discover which elements of the online discussions they would recall and consider important after a moderate period of time had passed. As noted in Table 3, subjects were asked open-ended questions about what they recalled, specific questions about the online activity, questions about the educational psychological principles they learned in the class, and questions about the technical features of COW.

There were several recurring themes and notable comments that resulted from the interviews. The first theme that will be described relates to the pragmatic nature of the students related to their views and uses of the conferencing system. The second theme concerns how to create engaging discussions that others will respond to. And third, issues of how and why students interacted in the discussions will be addressed. These students used such terms as enjoyable, interesting, humorous, responsive, and honest to describe the COW conferencing.

In terms of the first theme, the pragmatism mentioned by subjects in the interviews involved the challenges they observed in their field experience. This is not surprising considering the potency of some of the cases that were discussed--such as cocaine usage by K-12 students, whether paddling should be used in the classroom, and how to deal with ADHD students. Of course, not all cases were this dramatic, but in the hundreds of cases discussed, many addressed challenging issues students witnessed daily in their early-field experiences. When subjects answered interview questions about educational psychological concepts, most of them said they could not remember the names or details of the concepts they learned in class. Instead, these concepts seemed to manifest themselves by giving the students new ways to interpret their experiences and cases they read about in COW. Subjects even commented, "The theories made me look at the cases differently." Vygotsky's idea of a ZPD supports this finding. Undergraduate students may be unable to grasp the labels or intricacies of a given theory, but their classroom learning can be enriched by studying theory in action and discussing it with instructors, mentors, and peers.

As the surveys indicated, dramatic or controversial cases fostered extensive student interaction. However, the majority of cases were not overly dramatic; instead, according to the students in these interviews, the quality of comments posted tended to affect the level of interaction about a case. In particular, the subjects commented that interaction increased or decreased depending on the depth of the first few responses to the case. Some responses were described as obviously being done quickly to fulfill the assignment. These comments led to low or moderate level of student interaction about the case. Other comments were well thought-out and referred back to the student who posted the case or students who had previously replied. These thoughtful comments led to higher levels of student interaction, or as one student put it:

> *And so, it was really interesting to see all (the) different input people had and different viewpoints that people had that I didn't have. And I think that that really stressed [to] me how important it is to talk with your fellow teachers or your coworkers and get their opinion on a situation that you just don't know what to do with it. Your opinion is not going to be what everyone else's is. In a regular classroom, at least a lot of times, one person will tend to talk or there will be a couple of people who are very interested in something and they'll be the ones who will talk for the majority of the class. Whereas in an online discussion, everyone needs to participate or else you don't get a grade. Of course, there were a couple*

of people who wouldn't participate for a week or would write one or two sentences but then their grade suffered because of that.

In past implementations of this project, we were concerned with the lack of depth or controversy that occurred in these online discussions. Presumably, more controversial postings would also lead to greater interaction. But as one subject noted, it was difficult to post a controversial or contradictory comment to a student you did not know. Of course, this view is the antithesis of the "flaming" that sometimes occurs in online discussions. When asked to consider flaming, the subject responded that an educational context where a teacher reads and evaluates your postings actually minimizes the chances for flaming to occur. Still there was plenty of honesty or candidness felt in peer comments.

One subject noted that regardless of whether there was high or low interaction in a case, the interactions were "choppy." The basis for this description was that continual discourse between two or more students was minimal. Instead of interactive discourse, students would reply to a case and not return to it, so the result was a series of comments made by different students (i.e., a one-way interaction scenario where most participants simply reply to the author of the case). Since students were not required to return to a case in which they replied, highly interactive and responsive participant postings were limited. The assignment could be modified, but since this project involves hundreds of students, keeping the assignment simple had the benefit of reducing confusion by many students. In fact, there were few criticisms about the assignment. To the contrary, as is a common theme of online learning research (Harasim, 1995; Hiltz, 1994), the assigned task or goal was consistently described as the main motivation for students to interact in the system.

Regardless of this trait of the online discussions, most of the subjects found the variety of perspectives to be one of the most valuable elements. A common response during the interviews was that the subjects read reactions and suggestions to many cases that they would not have considered. This finding speaks to the benefits of group problem-solving and learning. Reading and replying to the cases posted by others was also valued by the subjects because it allowed them a chance to consider authentic experiences that they were likely to encounter when they became teachers. Nevertheless, the subjects had mixed views about what part of the assignment they valued most. Many comments were made about how subjects looked forward to getting replies to the cases they posted, but others mentioned that they were more interested in replying to other cases than interacting within their own case. Still others mentioned that they enjoyed reading the cases and exploring the interactions but were less interested in responding (i.e., they were "lurkers"). One student, in fact, stated that:

> *I think this is a lot better than a journal because I've done a journal for a whole semester. I benefited from the feedback between... everybody. With the journal, you're just writing it down. You're making mental notes. On this, you're getting feedback and responses from other people. I think it was more beneficial...It was an interesting tool, and I think it should have been implemented more--make it more of a requirement.*

In contrast to questions about the online interactions, the subjects were also asked to evaluate COW as a learning tool. COW is a lean system modeled after ´The Well,´ a conferencing system commonly referred to as one of the most established and intellectually rich discussion sites on the Internet (Hafner, 1997; Moore, 1995; Rheingold, 1993). Consequently, COW was designed to make it easy to know how many new notes are posted in which discussion area(s) and how to navigate to those notes (Malikowski, 1997). In this regard, COW focuses students on the text of the

discussions. It does not contain threaded messages, automatic icons, or categories of individual postings. In our experience, such additional features convolute the discussions when hundreds or thousands of notes accumulate, which is common in online learning communities (Bates, 1995; Ellsworth, 1995; Hammond, 2000; Harasim, 1995; Kear, 2001; Lupo & Erlich, 2001). When the subjects were asked what they thought of the lean COW interface, they answered that this made it easy to use and to focus on the content of the case discussion thread. A few comments were made that icons "might be nice, but I wouldn't want to use them a lot because things would get confusing."

After considering the issues that emerged from the interviews, it is interesting to note that student comments were similar or identical to the historic challenges of any teaching environment. For example, encouraging students to consider theory over practice and asking them to provide thoughtful input to class discussions are age-old challenges in education. It is also common for students to enjoy hearing about "real-world" challenges they may face when they complete their studies.

Of course, online discussions offer several other unique elements. For example, students could participate in COW at their leisure, as long as they completed the assignment. In addition, the simple, text-based interactions made it easier for timid students to interact with boisterous students. Based on the student interviews, however, the effects of the technology were minimal. Where technology played a key role was in stimulating student interest in reading and responding to issues that mattered to them. This is a familiar theme of student-centered learning environments. Conferencing tools such as COW provide a means for actualizing the benefits of a student-centered learning environment. As indicated by the following quote, some of these students really liked these learner-centered approaches:

> *I know it may sound weird, but in the online class, I felt like I knew the people better than I did in a real class. We felt like we knew everyone just because we had to interact so often. It was very cool. I still feel like when I see these people in the hall, I know who they are. I feel like I know them ten times better than anyone else I had classes with.*

Conclusions

Our previous work on electronic case-based learning among preservice teachers indicated that asynchronous environments are valuable tools for authentic case creation and discussion, at least for a relatively short period of time of two to three weeks. In this study, the electronic learning environment was richly flavored with hundreds of interesting case problems and issues over a two-month conferencing period. Though the discussion peaked near assignment due dates, few problems of technology access and use were noted.

Despite the general conferencing success, there were a number of obvious problems. For instance, allowing students to "name their own topics" was motivating for students, but detracted from students' case categorization. For whatever reason, few students found that cases such as "Motivating the unmotivated" belonged in the general-case conference. Instead, they tended to post them in an unclassifiable "Your Own Case Topics" category in the secondary or elementary conference. Why did they not see the generality of their cases? Were they wearing blinders? Perhaps having separate conferences for elementary, secondary, and all-grades students, as well as a general-case conference proved to be too complicated for undergraduate students. Perhaps students just did not see how their field experiences connected to important concepts and topics from their class.

As we also found in our previous study, there was minimal case discussion that was grounded or backed up by justified reasoning. In addition, undergraduate student mentors, for the most part, provided surface level commenting with minimal evidence from the research literature or existing theory to ground their recommendations and opinions. While this was not unexpected, it was not without some hint of learning; students must build from their personal experiences and observations in understanding educational psychology course material. Tools for electronic conferencing, therefore, should have built-in features for designating such linkages and course connections (Duffy, Dueber, & Hawley, 1998), and perhaps creating concept-based hyperlinks to case testimonials or legacies from previous semesters. In addition, when students begin to receive confirmation of their ideas and insights, they will more fully appreciate the power of linking theory to practice. In terms of other technology enhancements, color buttons or case feedback links might speed up access to case responses and also make unread comments more salient. Other features that might be built include a tool for recategorizing existing cases into different categories or an option for creating a mega-list of the 100-200 most controversial or engaging cases. Retooling cases and sample responses for later use may, in fact, be the best use for these cases.

Students, too, perceived the problems with the tools available for structuring case feedback. Student surveys indicate that when participation structures are highly open-ended, many students wait until the last minute to contribute to the discussion. As a result, procrastinating students received limited case advice and feedback and were generally disappointed. Another hindrance to student online learning is when the instructor fails to embed the activity in course requirements (i.e., treats the activity as optional or extra work) and does not model the types and quantity of case feedback expected. When teachers ignore the discussion, so too will the students; especially in a survey class with extensive readings and assignments.

Not all student comments were negative. Many students pointed to the usefulness of multiple or different points of view as well as the pointed feedback from instructors. In contrast, students not only were exposed to new ideas and viewpoints, but also were simultaneously getting confirmation of their views and a notice that they were not alone in the various problems they witnessed in schools. Moreover, there were commonalities in the ways in which the type of problems related to management, motivation, individual differences, etc., were handled. Some students appropriately noted that the ability of a conferencing tool to readily exchange and expand information was beneficial for their learning. In a similar vein, a number of students mentioned that the capability to be helped by others was extremely important.

Beyond the general surveys, data was collected from the eight in-depth student interviews. Since these were all volunteer students, it was not surprising to find that they considered the COW project to be more beneficial than the survey findings indicated. According to the interview data, case controversy or conflict was not as important to peer interaction and responsiveness as peer thoughtfulness related to early case postings or responses. When the case and initial student feedback was thoughtful and interesting, students were more inclined to join in the discussion. Perhaps determining what is a "thoughtful" response is an issue that should be examined in future research. One of the biggest problems in the case format used in the study was that students wanted more interactive and less "choppy" discussion. It is likely that having six course sections of 170 students and four conferences to post cases caused some confusion about where to go to submit and read cases. A smaller cohort of students and a more limited number of conferences may alleviate, or at least lessen, this problem.

Despite the limited direct linkages to the textbook in these case discussions, students

interviewed pointed out that the case observations facilitated their understanding of human learning and development and vice versa. Hence, while concepts were not explicitly stated, the COW project did enrich their learning. Simply reading the range of case situations and problems was critical to their apprenticeship in becoming a teacher. For some students, learning occurred in their reading and responding to cases, and for others, learning was facilitated in getting replies from a range of conference participants. Clearly, student learning was being scaffolded by peers in similar zones of proximal development as well as by more expert adult guides.

Further Activities

While we were successful in creating an environment wherein students generated and discussed hundreds of authentic cases based on their early field experiences, the large number of students and conferences combined with limited pedagogical task structuring, promoted a less responsive and interactive environment than anticipated. While the instructors asked their students to create two cases and respond to the cases of four to five of their peers, the COW project may simply have been too open-ended for these undergraduate students.

Our research team addressed the above findings and issues in a number of ways since that time. First of all, to foster more feedback, social interaction, and timely responsiveness, during the spring of 1998, we added four practicing teachers and three associate instructors as student mentors through grant stipends. As a result, there was more modeling and feedback from the instructors than in the past. Second, as a means of extending this mentoring, we limited the number of students from our university to less than 100 or approximately three classes instead of six. Third, we attempted to foster student understanding of the generality of the issues reflected in the cases by combining all different grade levels and majors into one joint conference. At the same time, we purposely warned students, through training as well as conference topic labeling, to use the topic, "Your Own Case Topics" as a last resort. Fourth, based on an analysis of more than 1,000 student cases used in previous semesters (e.g., "My student and cocaine," "Paddling," "Channel One," etc.), we created and refined a set of 36 practice cases (see "The *Caseweb*" at http://www.indiana.edu/~caseweb). Such case legacies provided a place for students to see model case descriptions, problems, peer commenting, and potential resolutions. We also expanded our list of examples of online mentoring for practitioners and instructors to use in interacting with students. Training of students, at the same time, was more focused on backing up one's arguments and claims as well as linking case discussion to concepts in their lectures and course readings. Finally, online help within COW was also more strategically placed for student use.

What else have we done? While we limited our local participants, during the following semester we added 30 teacher education students from two universities from Finland as participant mentors. Whereas these students mentored our students on the cases they generated on the Web, our students also mentored them. Since Finnish students could only enroll in teacher education programs after an initial degree, they were an older cohort who tended to use their greater experience and expertise to scaffold our students. Importantly, there were separate case conferences for Finland and the United States, which displayed the logos of the respective universities upon entrance. To foster cross-cultural collaboration, an international cafe was added to create a shared space for student discussions. In these student-created topics, students had an opportunity to understand each other on a personal level, thereby building intersubjectivity among participants. Such common knowledge and conference personalization was enhanced through a few videoconferences between the sites at the start and the end of the

semester.

Many key results from the foreign participation have emerged. For example, COW cases were much longer than previous semesters. Students wanted to read what others from another country had to say. In addition, student discussion from Finland had greater linkages to the research literature and bolstered the dialogue among students in the United States. In effect, the reasoning was more justified and responsive to others than in previous semesters.

In the following semester, we attempted to include students in our overseas cultural immersion programs or in Native American reservations during their final semester of student teaching. A goal here was to have vertical mentoring from these college seniors to combine with peer-related, horizontal mentoring already incorporated in the COW conferencing. A second purpose was to prove that we could reconnect students to our university no matter where they may be in the world. Unfortunately, only a couple of cultural immersion students used this conference, in part, due to limited access to technology in sites such as Native American Reservations, and, in part, due to this task being optional.

To extend the range of insight and advice within COW to teacher educators around the globe, we designed "The Intraplanetary Teacher Learning Exchange" (TITLE). In TITLE, students and instructors met in a single English-based conference with many topics. During a two-year period, students from Korea, Peru, the United Kingdom, Finland, and the United States participated in TITLE. No longer was this a local or regional project. Now preservice teachers in the TITLE project could create case situations on the Web based on their early field experiences and offer feedback to foreign peers as well as obtain feedback from them. While such a project was not possible a decade ago, our initial case-based learning research laid the foundation for the extensive electronic mentoring that TITLE facilitated in the development of future teachers.

As such projects meet with success, we will begin to understand how to provide electronic mentoring and move these teachers toward expertise, while enhancing their understanding of collaborative and interactive educational technologies. When we are done, perhaps these global networlds can serve as safe harbors for preservice teachers to try out instructional ideas and reflect on their early field experiences while being electronically apprenticed into their chosen field.

End Notes

[1] The COW project was first piloted in the fall of 1996 and continued through the spring of 2000. In the latter semesters, it was renamed "The Intraplanetary Teacher Learning Exchange" (TITLE) due to expansion to other universities and locales.

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Appendix A. Example of Conference Layout in COW: Cases for Everybody

Cases_for_Everybody

Instructor: Julie West (email: Jwest@indiana.edu)

Welcome to the Early Field Experience Conference! It has been created for you to

exchange questions, answers, and ideas with other students, faculty and teachers during your field experience. You can also view the discussions for All Grades Cases, Elementary_Education_Cases, and Secondary_Ed_Cases.

Some of the topics listed below are RESTRICTED to either students, faculty or teachers. Other topics are PUBLIC and anyone may participate. But Steve Malikowski and Judy East serve as "fair witnesses" to this conference, and they can read ALL messages.

Topics: (Click on a topic to see how it works.)

Number	New	Topic Name
100	124	Elementary Cafe
101	165	Secondary Cafe
102	1	All Grades Cafe
104	40	Community Cafe
105	0	Field Experience Tips and Advice
110	6	Alternative Instruction Cases
111	156	Assessment and Grading Cases
112	21	Behavior/Class Management Cases
113	5	Diversity and Individual Differences Cases
114	0	Effective Teaching/Schools Cases
115	0	Learner-Centered Cases
116	0	Learning Styles and Multiple IQ Cases
117	15	Motivation Cases
125	10	General Cases
126	0	Bigger Global Issues
127	0	Other Miscellaneous Issues

[COWSearch]: Search This Conference

Appendix B. Example of Topic Cases

Secondary_Ed_Cases topic 170
Your Own Cases--Secondary
by Julie West (jwest)
Date: Sep. 12 2:51 PM 1997

Recent Conversations for Secondary_Ed_Cases, Topic 170: [COWSearch]

Number	Total	New	Conversation
24	1	1	The girl who doesn't care!
13	13	13	My student and Cocaine
23	1	1	The girl who doesn't care!
7	11	11	Channel One
14	7	7	Fragile student stomped by substitute
15	3	3	Slipping through the cracks!!
17	1	1	Disciplining Students
16	1	1	Learning Disabled Students
12	1	1	Harriet Tubman is a Fictional Character
1	5	5	Attention thirsty students

Appendix C. Example of Case Dialogue in COW

Conference: Secondary_Ed_Cases
Topic: 170. Your Own Cases--Secondary
Conversation 13

My student and Cocaine

All posts and replies

1. Author: Name Removed (Username)

Date: Oct. 22 7:05 PM 1997

The first day of my observing I connected with a female student. She felt comfortable talking to me and frequently asked me for help during the two class periods I was observing. She is the sweetest girl I have in any of my classes. She is helpful, considerate, and extremely bright.

I have been back to observe twice since then. Today 10-22-97, when I went to observe today, she was not in class. I asked the teacher if she had been absent the day before, and I asked him if she had a regular attendance problem. The answer he gave me just floored me. HE told me that she has been on house arrest since a week ago last Saturday. I asked what for and he said that she waiting on a hearing over a pending felony charge of possession, consumption, and sales of Cocaine on school grounds. I was totally appalled. But what made it even worse is the comment he made about her. HE said, you just can't help kids like that! I nodded my head in agreement, but I completely disagree. What do you think, are kids like her unreachable or unhelpable?

2. Author: Name Removed (Username)

Date: Oct. 23 3:50 PM 1997

Wow! This is the kind of thing you hope you never have to deal with as a parent or teacher. Unfortunately, these types of things are very common in today's society. Young people are often the most impressionable, and very willing to take risks. In my personal view, I think that drug abuse and use need to be dealt with in a different manner than it is being dealt with today. There should have been warning signs if this student is a chronic cocaine user. Teachers must be able to detect these signs. Often times this just means listening to the students. If the warning signs are present and a teacher has suspicions, very careful action must be taken. Punishment is not the answer, and comments like your teachers are even worse. You can help kids like this!! You cannot be afraid to reach out to this student. You could change their lives forever. You need to educate your students about what can happen when you use drugs, you don't need to tell them how to run their lives. This girl is a prime example of someone who probably didn't know what would happen to her if she used drugs. This teacher could have made the difference.

5. Author: Name Removed (Username)

Date: Oct. 29 4:04 PM 1997

I can't believe your teacher said that. That's ridiculous!! Kids like these are the ones we should be trying to help the most. If your teacher thinks that the most important thing for his students is to learn what he's teaching, then he's right. I think that most often teaching our subject to students is one of the least important things we do.

6. Author: Name Removed (Username)

Date: Oct. 30 10:38 AM 1997

I agree with #5. The kids like this are the kids that we should be trying to reach! If we as teachers don't try to help them than who will? Certainly not the judicial system. I also hope that you (Username) don't let this stop you from helping another student. I've dealt with people like that and your attention and belief in them might be the thing to turn them around whether it be now or a year down the road.

7. Author: Name Removed (Username)

Date: Nov. 6 12:34 AM 1997

I agree with Jimmy (Username). When you see cases like this it makes you realize that the anti-drug propaganda, pushed in our schools, is failing miserably. I am not saying that I condone the use of cocaine or any other controlled substance. I am saying that the war on drugs is a joke and that this child is one of the many casualties of this joke. You must also consider the fact that just possessing a certain amount of a controlled substance on school grounds is cause for criminal charges to be brought against a person. She may not have been selling but if she was in possession of a certain amount she can still be charged with intent to sell. This is a very serious charge and depending on her age, if convicted, there may be very serious consequences.

If you feel that you know this person well enough, you might want to try and contact her, give her your moral support. Something like that would be very important to her right now. She is probably feeling very scared and alone.

9. Author: Name Removed (Username)
Date: Nov. 13 12:14 AM 1997

WOW! Don't even think about giving up on a student like that! I was that student (Username) and I wish someone like you would have been there to wake me up!! I dated a person that influenced me heavy about drugs. At this impressionable age I fell into this life style and wasted numerous years of my life. After abusing drugs and being abused physically for five years I finally got away from it all. I got pregnant and quick using cold turkey. Sad that it took this to make me realize that the situation I was in was not healthy, but some never get to this point so I guess I didn't fry all my cells. This is when I realized what I had done to myself and how much I had missed out on. I also hurt a lot of people in the process. I wasted my intelligence and lost all self-respect. I think drug testing in the schools is a great new idea. If I had this I don't think I would have "experimented" with drugs. My son's father was ignored and his problem still exists because no one chooses to address it. His addiction has even made him refuse to take or pass a drug screen so that he can see his child. I have seen so many people waste away because no one cares. You can't help someone until they chose to help themselves, but don't ever not offer it! As long as people like you are there to listen, things can get better! PEACE

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About the Authors:

Dr. Curtis J. Bonk is a former CPA and corporate controller who received his master's and Ph.D. degrees from the University of Wisconsin. Curt Bonk is now an associate professor in the Departments of Counseling and Educational Psychology as well as Instructional Systems Technology at Indiana University (IU). He also is a core member of the Center for Research on Learning and Technology. He received the Burton Gorman teaching award in 1999 and the Wilbert Hites Mentoring Award in 2000.

During the past few years, he has been a visiting scholar in Finland, Canada, and Australia. Curt is currently a Senior Consortium Research Fellow with the Army Research Institute. He edited "Electronic Collaborators " published in 1998 by Erlbaum. As a result of his work on pedagogical strategies for Web education, he has given hundreds of national and international talks on this topic. He is President of CourseShare.com, which he founded in 1999. Dr. Bonk can be reached via e-mail at cjbonk@indiana.edu and his homepage is http://php.indiana.edu/~cjbonk.

Dr. Charoula Angeli is a lecturer in Instructional Systems Technology at the Department of Educational Sciences, University of Cyprus. She pursued undergraduate and graduate studies at Indiana University-Bloomington, USA (B.Sc. in Computer Science 1991, M.Sc. in Computer Science 1993, and Ph.D. in Instructional Systems Technology 1999). She worked as a Post Doctoral Fellow at the Learning Research and Development Center at the University of Pittsburgh. Her research interests are: utilization of educational technologies in primary, secondary, and higher education, design of computer-enhanced curricula, educational software design, teaching methodology, and design of learning environments for the development of critical thinking skills.

She is currently researching how primary school teachers adopt computer-based technologies, and ways the positive and negative aspects of technology can be managed through good design and implementation.

Dr. Angeli can be contacted at cangeli@ucy.ac.cy

Steve R. Malikowski is a doctoral candidate in the Instructional Systems Technology Program at Indiana University and instructional designer at Walden University. Walden is unique in that it has exclusively offered graduate courses through distance education since 1970. In his work, he assists faculty, who reside in multiple states and countries, create graduate courses that are offered over the Web for distance education. He is also conducting his dissertation research with new students at Walden University. This research is a qualitative analysis of how to best serve students who are new to Web-based distance education. His past research and projects have involved having students from multiple states and countries analyze issues they have in common, such

as being a new K-12 teacher. In a recent publication, he deals with issues to consider when selecting a Web-based conferencing system.

Malikowski, S. R. (1997). Interacting in history's largest library: Web-based conferencing tools in B. Kahn (Ed.), Web-Based Instruction (pp. 283-294). Englewood Cliffs, New Jersey: Educational Technology Publications.

Mail comments, questions, or related ideas to smalikow@indiana.edu.

Lauren Supplee, M.S. is a doctoral candidate at Indiana University in educational psychology. She is interested in early child development as well as technology in education. She currently works at the University of Pittsburgh as the project coordinator for an NIMH funded research study. She can be reached at lhs6@pitt.edu.

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EDUCATION ed AT A DISTANCE

Ed at a Distance
Magazine and Ed Journal

August 2001 Vol. 15 : No. 8

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Editor's Note: This research was authored at The Open University (OU) in Great Britain and published by the Australian Journal of Educational Technology 2000, 16(2), 173-200. AJET 16, http://cleo.murdoch.edu.au/ajet/ajet16/mason.html. USDLA is grateful for their permission to publish this article. It provides a definitive set of reactions to Open University courses offered in the timeframe of the study. It provides a benchmark for comparing student reactions to online courses wherever, whenever and however learning takes place.

Factors affecting students' satisfaction on a web course

Robin Mason and Martin Weller

This paper takes the form of a dialogue between the evaluator and the course team chair of a very large web-based course presented by the Technology Faculty of the UK Open University. An extensive evaluation has been conducted following the first pilot presentation of the course, and the two authors discuss the findings as they relate to students' satisfaction with the course. Seven key issues are raised: skills versus academic content, students' previous computing experience, interaction through computer conferencing, online group work, online tutoring, students' lack of time, and revising a course in the light of evaluations. Finally, the results of this course are compared to three other web courses.

Introduction

This paper takes the form of a dialogue between the two authors, one the evaluator and the other the course team chair of an innovative web-based course at the UK Open University (UKOU). The evaluator has collected extensive feedback from students and tutors on the first presentation of the course in 1999, through web questionnaires on each module of the course, through student activity logs and through telephone interviews. The course team chair authored a third of the course and led the team of academics, editors and web designers who developed the course. He also supported tutors and students during the first presentation and responded to several hundred emails.

The UKOU is an adult distance teaching university which has built its international reputation on the quality of its printed course materials and its supported open learning approach to course delivery. Its technology strategy is to use new media as they enhance this process, increase access for students and add value to the teaching and learning experience. Telecommunications technologies, especially text-based asynchronous interaction, has been implemented widely across many disciplines, as has multimedia in the form of CD-ROMs. Real time Internet and web technologies are beginning to be useable, now that home based access is available to significant proportions of the 250,000 student population of the University.

The discussion which follows draws out the complex web of reactions students have to the 'technologisation' of higher education, and explains one approach to this complexity through a particular, innovatory course.

The course was T171 You, your computer and the Net. It is an entry-level course about information and communication technology (ICT), delivered entirely over the web with online tuition. The course is studied part-time over 32 weeks, and requires about 200 study hours. The course consists of three modules:

- Becoming a confident computer user - an introduction to basic computer skills and applications, using the Internet and group working. The material was taught in a generic manner, so it was not software package specific.
- The story of the personal computer - using the set text, Accidental Empires (Cringely 1996), to tell the basic story of the development of the computer, the module explores technological, social and economic issues raised by the material.
- The story of the Internet - using the set text, Where Wizards Stay Up Late (Hafner and Lyon 1998), again to tell the basic story of the development of the Internet, the web site material explores issues such as the development of protocols, paradigm shifts and social impact of the Internet.

There are four tutor marked assignments (TMAs) during the course and an end of course assessment (ECA) replacing the conventional exam. Students have to construct their work as HTML documents and submit them electronically. The course has been described in detail elsewhere (Weller 1999). The course was piloted in 1999 with 850 students.

1. Teaching skills or an academic discipline?

One of the key issues which emerges from the student feedback data is the dissatisfaction many students (nearly a third) felt about the lack of skills training they received on the course:

> "I wanted more experience on using search engines."
>
> "More web creation skills eg. tables, frames, forms, scripts."
>
> "More hands-on and less reading and detail about the development of the Internet."
>
> "I'm not interested in how the Internet started; I want a job and need practical experience."

The course purports to have students creating web pages, word processing and generally managing their personal computer by the end of the three modules. Yet the second two modules of the course are largely devoted to the history of the Internet and of the web. A good two thirds of the 150 or so students who filled in questionnaires found this balance between the 'how' and the 'what' very appropriate (Chart 1), and appreciated that the background to the Internet and the web helped them build a solid understanding on which to base the particular skills of web design etc:

> "If you don't know the development, you don't understand the issues of today."

"Modules two and three covered a broad range of areas. They opened up many channels which I could investigate further."

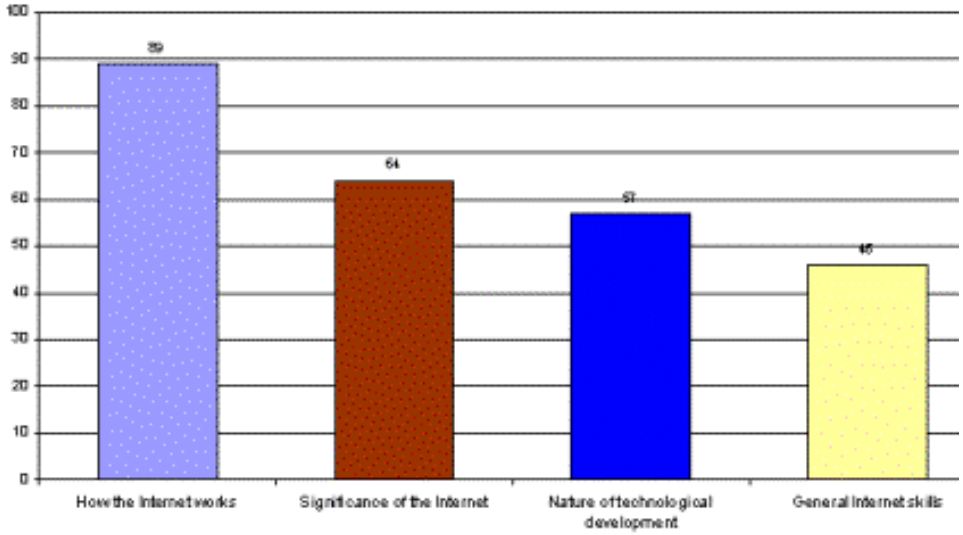

Chart 1: Percentage of students reporting an increase in understanding

This course is about the personal computer and the Internet and what these technologies can do. It is obviously appropriate, in fact necessary, that it teach skills in searching, managing, browsing and creating information. But these skills are not the traditional stuff of an undergraduate degree; usually in pre-computer days, one assumed these information handling skills would be picked up along the way. So on the one hand, there is the tacit academic view that we don't give credit for skills but only for understanding; on the other, there is demand from students for job-related skills.

How do you see this conflict as a course designer? Do you think that the digitisation of information has changed the balance between skills and understanding? How do you respond to the many students of this course who feel angry, misled or disappointed about the level of their skills at the end of the course?

Course Chair's response

This was one of the issues which concerned us greatly in the course design stage. This tension between training and academic level arises in many ICT courses, for instance learning a programming language and learning the principles of software engineering. As an entry-level course which can count toward a university degree, T171 needed to be of a suitable academic standard. We were aware however that many students wanted to learn software skills, and that many were interested in this one course, and had no intention of studying further.

Module one of the course has an activity-based approach, and introduces students to common applications such as word processors, spreadsheets, graphics etc. It also gets students online, using e-mail, and writing web pages. At one level this can be seen as training, but it is integrated with academic material about group formation, communication, clients and servers, and so on. There is also a strong emphasis on learning to learn, so students new or returning to study can develop their study skills.

With the remaining two modules, one of the aims of the course team was to bring students into the ICT culture. A powerful tool for enculturation is the use of narrative, which is why the modules make use of historical accounts of the development of the personal computer and the Internet respectively. However, the modules are not really

about the history of these technologies, but rather they use these narratives to provide a structure from which to cover a broad range of areas, including the technology in detail, the impact of these technologies upon society, the nature of technological development and the ICT industry.

In many ways we are tracking a moving target with regard to the skills our students need. The level of computer skills is constantly improving, so what a course needs to include one year may become assumed in later years. This is particularly true of a level 1 course delivered via this medium. Many students were completely new to study, and to the medium itself, and some account must be taken of this. People are very familiar with print and text, but not so with web sites. Thus in some respects we are introducing people to a new learning medium. Again one of the reasons we chose a narrative based approach was because of the familiarity and comfort it offered in this new medium. Other research has shown that narrative can provide structure for multi-media learning material (e.g. Laurillard 1998).

Many students feel they want the skills training because this will help them with employment. However, there may be a mistaken belief about what employers are looking for. It is increasingly the case that employers are looking for more than just skills in one area, but rather transferable skills, or at least evidence of a broader knowledge. I think T171 gets the balance about right here, in that it provides sufficient skills, such as basic HTML, and it gives students the context and opportunity to develop these further, for example through quite open assignment specifications. By giving students the confidence to use software and a meaningful context in which to develop it, their software skills can go beyond that which is taught explicitly in the course, and indeed beyond what they would gain from a straightforward training course. This was borne out by the sophisticated web sites many students created for their end of course assessment. Students also gain an appreciation of the wider implications and possibilities of these technologies. Since the 1999 presentation finished several students have reported that the course has been significant in gaining them new employment:

> "I thought you would all like to share in my good news. I applied for a job with [deleted] and had my Board last Friday. I've now been offered a training attachment with them. They were very impressed with how much I knew about the Internet and web pages ... if you're looking for work in this sector - start applying - we certainly seem to have grasped what employers want to hear! "

As with many courses, students' expectations about the course play a critical role in their ultimate satisfaction. For the 2000 presentation we have produced some preparatory material, and this states very clearly that students should consider T171 an academic course, and not a training course. So, I feel we provide enough of a training element so students can gain new skills, without compromising the academic nature of the course. As long as students are made aware from the outset of the nature of the course, then I think they will be satisfied with what it delivers.

2. Students' previous computing experience

This course is a first year undergraduate course in the Technology Faculty. It requires no prerequisite knowledge and no previous experience with the computer. Yet amongst the first cohort of students there was a very wide range of abilities (Chart 2): from

those with absolutely no computer experience right through to experts in various aspects of computer use.

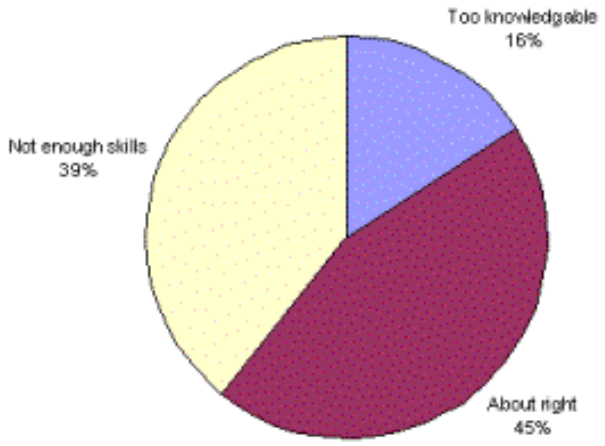

Chart 2: Students starting knowledge

The pervasive nature of the computer has led to a very wide range of abilities, attitudes and experiences of its use: for example, one student had built several computers as a hobby, but had absolutely no experience of the networked computer and had never accessed the web. Another student taught databases at his university, but he said he had real difficulty with the technical side of this course. Many students who were entirely new to computers went through a very steep learning curve especially at the beginning of the course. Some dropped out complaining that it was far too difficult; most of those who stuck with it until the end reported a tremendous sense of achievement:

> "I nearly gave up several times and I was absolutely knackered most of the time keeping up with my job and the course, but I am very satisfied that I met the challenge and stuck it out."
>
> "It was an incredible struggle, but I enjoyed it."

Preparing a course about the technology for people with such diverse backgrounds must be an almost impossible task. How can you expect to keep the experienced students challenged and yet provide the high levels of support and introductory level of materials for complete beginners all on the same course? Amazingly, by far the majority of students on the first presentation were very satisfied with the course (Chart 3)- how do you account for this? What do you have to say to those students who complained that the course did not cater for new comers to the personal computer?

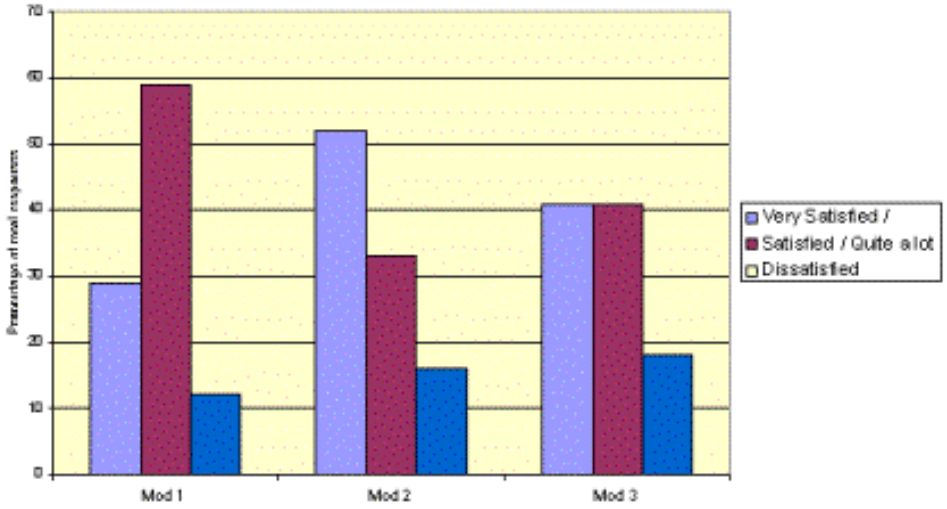

Chart 3: Student satisfaction levels by module

Course Chair's response

We deliberately set out to create a course with broad appeal, both in terms of computing experience and subject area. Given the pervasiveness of ICT the course was aimed at students from all areas, not just technology or computer science. In 1999 70% of the students were new to the UKOU. However, one of the problems was that in the pilot year the course mailing did not go out sufficiently early. This meant that computer novices did not have sufficient time to get comfortable using their PC before the course started. For the 2000 presentation we have produced a preparatory activities booklet, which contains optional activities designed to help newcomers become accustomed to using the Windows environment, navigating around a web site, and thinking about study skills. This was mailed in November 1999, with a course start date of February 2000 and so should allow the novices to feel more comfortable when the course starts.

At the other end of the continuum is the problem of keeping happy those students who already have a good grounding in this area. We tried to achieve this through several means. The first of these was the use of group work via computer-mediated conferencing (CMC), which many students had not experienced before. The more technically advanced students often found it interesting and rewarding to help their fellow students via this medium at the start of the course. Another way in which we tried to keep the course interesting was to cover a broad range of material, as I mentioned above. So, for instance someone with a technical background may have thought relatively little about the social impact of the technologies, or the management structures of ICT companies. Here students with little computer experience but with broader social or management backgrounds may be able to provide input.

In addition, the assessment, particularly in modules two and three is quite open-ended. Students choose from one of two titles, and are asked to produce a 'web-essay'. Students with a good grounding in the material already can use the web as a research tool, and integrate images and links into their document. Many students found the assessment a rewarding task to perform.

People have many reasons for taking courses, sometimes it is to gain knowledge about a totally new subject, to gain accreditation for knowledge they already have, to work towards a specific degree, or simply to consolidate knowledge they have gained on a 'piecemeal' basis over the years. This is borne out by comments such as:

> " I am enjoying the course enormously. I have found it very difficult at times, frustrating at times, and very challenging, but I have managed to keep going! My previous experience has meant that I had lots of 'bits' of knowledge but no coherent overall understanding. The course is beautifully constructed and I can really appreciate just how much work has gone into making it work, having prepared courses myself (at lower level). It is a delight to be a student and to be so expertly guided through the course!"

3. Computer conferencing: Underwhelming or overloading?

There has been a good deal of evaluation of the use of computer conferencing as a

means of interaction between students and tutors on distance education programmes over the last ten years. Indeed the UKOU has produced a good proportion of it (eg. Mason, 1998; Salmon, 1999; Wegerif, 1998). One way of characterising its use as an educational medium, is to say that its strengths are also its weaknesses:

- it doesn't require fixed times for study, but consequently other demands on one's time easily take precedence
- it maintains a record of all interactions - but this makes many people wary of committing their ideas to such a public forum
- it allows everyone to be 'heard', but this leads to an overload of messages which many find completely overwhelming.

One of the paradoxes of this medium which is very apparent in the student feedback of this course lies in the disparate perceptions that on the one hand, there were too many messages or that, on the other, there was too little participation. Nevertheless, as is usual with computer conferencing, there were many students who found the medium very satisfying:

> "I couldn't have coped without the conferencing."
>
> "The subject conferences are the best part of the course."
>
> "Because of the mix of people, there is a lot of self-help."
>
> "I wouldn't have understood nearly so much of the course if there hadn't been the support conferences."

However, the dissatisfactions expressed about computer conferencing on the course were contradictory. Newcomers to the computer tended to find the number of messages overwhelming and the competence and tone of the messages from experienced computer users very off-putting. At the same time, one of the biggest complaints about the tutor group conferences was the lack of participation:

> "I felt intimidated by the level of knowledge some people displayed in the conferences and by the manner in which they did it."
>
> "We need more small group conferences and people should be required to participate."
>
> "I found the online conferencing unusable. I tried a few times to get into the discussions, but without success. I would have had to be logging in every day for it to work and this was impossible."
>
> "The most disappointing thing about the course was the lack of participation in the conferencing."
>
> "Most people seem to be too busy to contribute to the conferences and this is a real pity."

The course conferencing environment consisted of tutor group conferences in which each tutor and the 12-15 students assigned to every tutor were expected to raise course related issues and problems. In addition there were course-wide subject conferences run by central academic staff to discuss the major topics in each module. Finally there were technical support conferences on topics such as word processing, networking, databases etc. These were moderated by specialist staff. Some of the conferences worked better than others (Chart 4) and what some students regarded as "life-saving", others found off-putting. A number of students suggested that those new to computing have their own groups and conferences, whereas many students found the support of

the experienced students invaluable. How do you cater for this range of requests? Can you satisfy the conflicting demands of students in this unpredictable medium? How do you regard the lack of online participation?

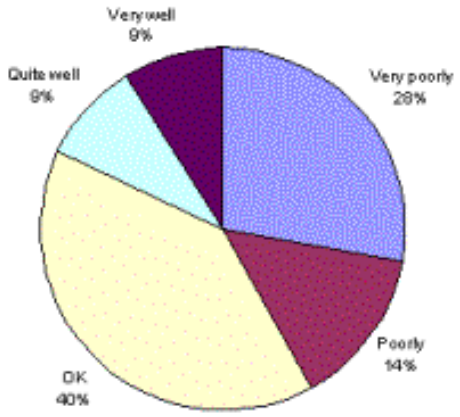

Chart 4: How well are the support conferences working?

Course Chair's response

Given the aim of T171 to introduce students to computers and the Internet, it would be difficult to conceive of the course not having a strong conferencing element. We saw the use of conferencing as a vital means of engaging students, as well as the means through which they could gain support. Sending and receiving messages was thus the first activity in module one.

Many students did not contribute to the national conferences, but they did read messages, and this can be very useful. As I mentioned above, for many people this is a new medium, and they are learning the appropriate skills. Some students reported that they felt they had to read all messages in every conference, and consequently spent a lot of time reading irrelevant messages. One student commented:

> "I wasted a lot of time reading messages which were irrelevant (to me) and in the end had to push and rush to get my TMA done. I do understand that this is completely my own fault but I find reading messages addictive and just have to look at the next one!"

As many students are new to study, they felt frightened of missing something so read every message. As the course progressed we tried to give students appropriate analogies for using the discussion conferences, for instance saying they were more like a party where you could join a conversation if you wished. This was to try and encourage students to be selective as to which discussion threads they followed. However, although we will continue to stress in our materials that students are not expected to read all of the messages or even all of the conferences, it may be that some students can only develop the confidence to do this through experience.

Active discussion has long been one of the aspects which is difficult to provide in distance education, with tutorials and summer schools being the usual means of achieving this. In T171 we deliberately wanted to provoke discussion on a range of issues, so 'embedded conferences' were placed within the web based course material. Here students were encouraged to go to the conference and discuss issues such as the role of Microsoft in the industry. As well as providing further interest to the material this helps students test their understanding of concepts through dialogue, which can

then be refined iteratively. This learning model of conceptualisation, construction and dialogue has been successfully applied on other OU courses (eg. Weller and Hopgood 1997).

However, many UKOU students choose to study at a distance precisely because they prefer to work alone, so there is an issue as to what degree the course should force people to participate. As UKOU students are adults we preferred to give them the opportunity to do as much, or as little, conferencing as they wanted or needed. We will continue to monitor the conferences, and encourage good moderator practice, so conferences do not become overwhelming for students. The use of conferencing must remain a vital element of the course, but we can do more to help students learn how to fit conferencing within their overall work commitments.

4. Online group work: A substitute for lack of face-to-face meetings?

One of the central features of the traditional UKOU student support system is the face-to-face tutorial held in study centres around the country. This course is the first level one undergraduate course to dispense completely with face-to-face meetings. It does, however, include a number of group activities and an assignment requiring a group web page.

There is a whole research literature on group work as a method of teaching and learning (eg. Tiberius, 1999) and a growing body of studies into its application in the online environment (McConnell, 1994; Hodgson and McConnell, 1995). Quite predictably, there were many complaints about the group work demands on this course:

> "It seems to have been forgotten that we students have never met, probably never would have met, and but for this course wouldn't speak to each other and then somebody expects us to work together like a well-oiled machine, I feel your expectations were too high."
>
> "There was a sharing of ideas, but little agreement or compromise. I found group working more of a hindrance to progress than a help."
>
> "The problems are all practical. I travel a lot and have to do my coursework in concentrated bursts. I feel I'm letting the other members of the group down - catching up on the conferences is a big investment of time for small benefit."
>
> "Trying to learn to communicate online was enough to manage initially; the necessity for group work so early on in the course created unnecessary pressure."
>
> "Forget group work - People either do or they don't. People (ie. British people) do not like to be told to do anything!"

These kinds of responses have been noted on other OU courses with a group work component (Mason, 1995; Thorpe, 1998). Nevertheless, feedback from modules two and three questionnaires contained many complaints from students that there was no group work! Chart 5 gives a quantitative view, but comments included the following:

> "There should have been exercises involving group work as in module one. During module two, we drifted apart, just as we were grasping the concept of team working online."

"Module two was less engaging than module one - it was all reading and note taking, and no group activities."

"Needs more active encouragement for group conferencing to continue."

"I would have like more opportunity to work as a group; I felt rather isolated during module three as my group didn't communicate much."

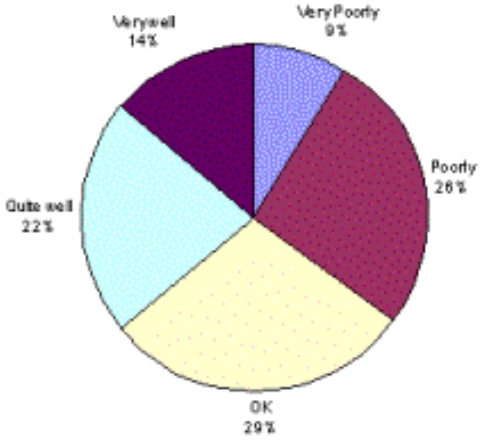

Chart 5: How well is your tutor group working?

The course obviously aims to give students a taste of group working as one of the important features of networked computing. In other words, the course content justifies, even demands it. Chart 6 shows students' response to this 'demand' in relation to the main national conferences. But does group work substitute for face-to-face meetings? Teachers who use group working practices in their campus-based courses would probably advise against trying to use it online, and especially not in mass distance education. Having seen the reactions of students for and against on the first presentation of this course, what are your thoughts about the design of successful online group activities?

Course Chair's response

The group work aspect fulfilled a number of roles on the course. Firstly, by getting students to engage in an activity using CMC in module one, it encourages them to become familiar with the technology which will then be useful throughout the rest of the course. As the group activity was linked to assessment, it also meant students had to get used to coming online, and communicating with others. They would thus be able, and willing, to ask for help and advice through the rest of the course from conference moderators, but more importantly from each other. We wanted to establish a tutor group and course community early on so that students could support and engage with each other.

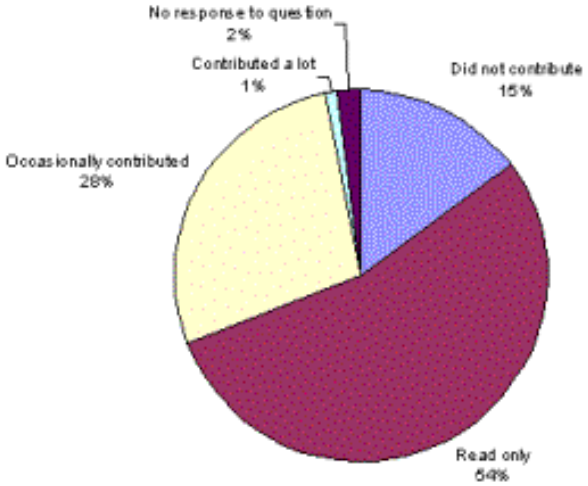

Chart 6: Student contributions to national conferences

The group work was linked to assessment, but in fact only the student's analysis of how the group had performed was assessed, so even if the group did not function well it did not affect their performance. What was important was to give them a taste of what group work via this medium was like, and thus to consider the possibilities of the medium. This meant they were forced to become aware of communication issues early on in the course. Due to an interesting discussion about tutor group participation in the national conference, we are changing the size of the tutor group from approximately 15 students to 20. Whilst 15 may be enough to maintain a viable face to face group, a CMC group may need slightly more to retain its 'critical mass' of contributors.

In conventional UKOU courses attendance at face-to-face tutorials varies but averages about 50%. Many students, for a variety of reasons, can never attend tutorials. Online tutoring allows all students to participate in the tutorial experience. This was illustrated by the following student's comment:

> "I am hard of hearing so this way of studying and keeping in touch with other students is ideal for me as face to face tutorials would cause me obvious difficulties. In fact, the main reason I was attracted to T171 is precisely because the whole course is conducted online, thereby giving me the freedom to participate in group activities by conference messages instead of sat with lots of people trying to figure out who is speaking to whom about what!"

In the survey of students who withdrew from the course, the reasons that were given as the main cause of dropout were increased work or family commitments. This is the same across all UKOU courses. Lack of face-to-face tutorials on the course was not cited. In fact, many students were initially hostile to the idea of group work, but later saw the benefit of it, and requested more group work later in the course.

It is also true that many students simply did not like this method of study. They much preferred the traditional UKOU course, with printed course material, face to face tutorials, summer schools and so forth. While online tutoring is particularly appropriate for this course, it may not be the case for all courses. With a modular degree structure students can experience both types of course presentation, and may well find that they prefer one form over another.

Interestingly many tutors reported that they had developed closer relationships with the tutor group than on conventional courses because of the greater frequency of communication. As with the training aspect, this will be an area where we can never

satisfy everyone. We will continue to use group work as a method of getting students to engage with the technology and each other, but it may be that we need to emphasise even more the nature of the group work, and how it relates to assessment.

5. Tutors - the make or break element of UKOU courses?

There is evidence from student surveys conducted by the Institute of Educational Technology going back over nearly thirty years that the support and guidance of the tutor is a crucial component in students' satisfaction with their learning experience. It is hardly different in face-to-face teaching and studies continue to conclude that technology-based courses are not teacher-independent, despite the hopes of the politicians and accountants (Bates, 1995). It is not surprising, therefore, that a course without face-to-face tutorials, trying to teach IT skills and expecting students to work collaboratively, is going to rely heavily on the quality of its tutors for the satisfaction and success of its students.

Of course there is a whole category of adult distance learners who just want to get on with the materials in their own time and who rarely, if ever, contact their tutor. Another category, of about equal numbers, can't get enough input from their tutor. They constantly request more tutorials, more tutor comments in online conferences, and more teaching, more controlling of overly talkative students and faster responses to emails. This course was no exception. Some tutors obviously provided exceptional support: prevented students from dropping out and made the course very enjoyable for others (Charts 7 and 8). Feedback from tutors on this, as on other OU courses which use computer conferencing, shows that tutoring online is perceived as more time consuming and that students are more demanding than on traditionally tutored courses (Mason, 1999). In anticipation of this, the course team prepared a range of materials for tutors (eg. suggested activities for their tutor group conferences, some mid-course review materials and information to use in advising students what follow-on courses were available after completing this course). Tutors found most of these materials very useful, but they did not reduce the overall workload of tutoring the course.

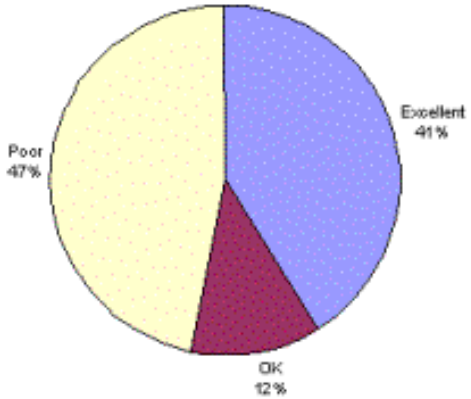

Chart 7: Comments on tutor performance

It is evident from some of the student feedback that a number of tutors put little effort into moderating their tutor conferences (Chart 9). In some cases, students of such tutors got on with group working despite their tutor's absence, or they gravitated to other conferences where help and advice was available from central staff or from other students.

In the year 2000, more than 12,000 student have registered to take this course - such is

its success and its growing reputation. However the demand to find good tutors with the necessary online skills may outstrip the supply. What lessons have been learned from the first presentation about the kind of support students are seeking from tutors on this course? What steps can you take to help tutors manage the workload?

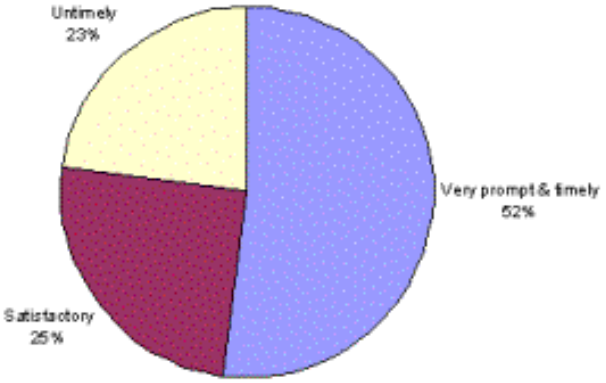

Chart 8: Student view of tutor feedback

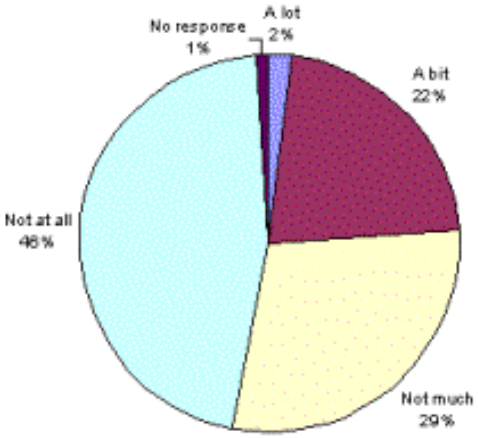

Chart 9: Use of tutor group for module two discussion

Course Chair's response

Many other OU courses are tutored at least partially online, so there is considerable experience of the medium amongst tutors and academic staff (Morris et al., 1999; Carswell et al., 2000) Many tutors reported that T171 was more time consuming than other courses. This was particularly true during module one, when many students are encountering their initial problems, and as an activity based module it requires greater input from the tutors than the other two modules. We have reduced the content of module one slightly for the 2000 presentation and reduced the amount of work involved in the assignments in recognition of this.

In order to support tutor we provide them with a number of ready-made activities, which they run at given times. There are also a number of support conferences for students, for example help with producing web pages, as well as the discussion conferences. Thus the tutor is not the sole source of help on the course.

Working via this medium in some ways requires more self-discipline than the traditional face to face tutorials. It is easy for tutors to start answering every question immediately, and soon find they are checking for messages several times everyday. At

the other end of the spectrum are tutors who keep putting off checking messages in their conference, which would not be the case for attending a scheduled tutorial in a regional centre. Again I think it is careful to frame expectations of students. The T171 tutors are only appointed part-time and so cannot act as computer technicians for students. Their role is to support the student and the academic material. We are very explicit in stating that it is the student's responsibility to have a functioning computer and Internet connection. The immediacy of the medium can sometimes lead to unrealistic demands on tutors. Some tutors arranged specific days of the week when they would check for messages, so that students knew that they may not get an immediate response, but they would get one by a specific day.

I feel that once tutors adapted to the method of working they could accommodate it easily within their normal working routine, and in many ways it was less disruptive than face to face tutorials and all they entail. The UKOU has a very well established staff development and monitoring process for traditional tutorials, and this practice has begun to be transferred to this medium. However, both for those involved in the staff development process and the tutors themselves, there are new sets of skills to learn and working practices to adopt. For 2000 there is some initial staff development which will occur before the course starts to cover technical issues such as using the conferencing software, and good moderating practice as well as the traditional material about the role of the tutor. There are also experienced tutors appointed on a regional basis to run course and technical support conferences throughout the year, where tutors can gain advice. I feel the experience gained on the pilot study last year will help us provide support to tutors this year, and many of the systems which were bedding down last year (such as the electronic assignment system) are now less problematic. We have a hierarchical support structure in place, and new tutors are being mentored by those from last year.

6. Time - the new distance

It has become a commonplace to note how busy people are and how time has therefore become a precious commodity. With the advent of telecommunications technologies, distance is less a barrier to education than it was before the networked personal computer. In fact, it is hardly an exaggeration to say that time is now the barrier that distance used to be in higher education.

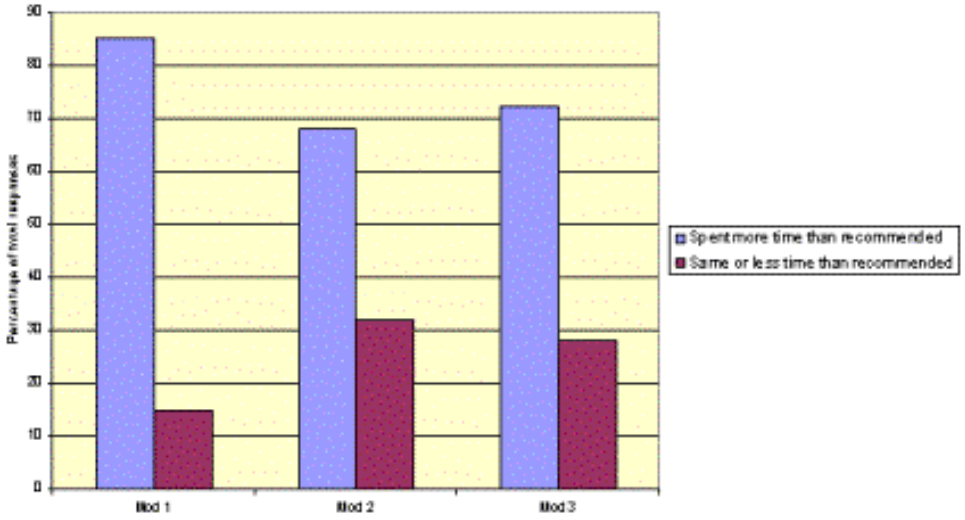

Chart 10: Time spent studying modules

Related to this, it is common in OU surveys for students to complain that courses take

them longer to study than the 10-12 hours per week expected on a full credit course. It is particularly common for students to complain about the workload on new courses in their first year of presentation. This course was, again, no exception to the rule. See Chart 10 and the following comments:

> "It is supposed to be a level 1 course, but I am spending three times as much time as other level courses."
>
> "I am enjoying the course but am finding it far more difficult than I anticipated and more work. I have just finished a BscHons with the OU and this is more difficult."
>
> "I am enjoying the course - I just need 36 hour days!"

Students new to computing said they spent three, four and five times longer, especially in the early weeks of the course. In later modules, many student complained about the amount of reading, especially reading from a monitor. There is general agreement in the tutor feedback that module one is heavy going, as is the first assignment (Chart 11). One student summed up the views of many:

"I am finding this course enjoyable in the way I would find bungie jumping enjoyable. I mean, you must just close your eyes and go, and when you touch down and achieve something, it feels great".

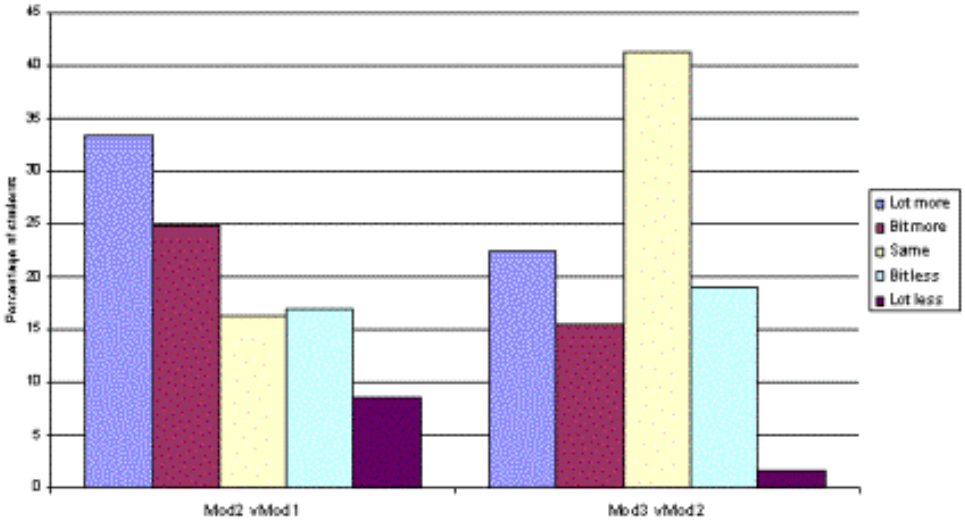

Chart 11: Comparison of workload across modules

Can we put these comments down to the usual first presentation hiccups? Or is the teaching of IT skills, especially at a distance, always going to be frustrating, unpredictable and more time consuming than other traditional subjects? This course combines a number of elements notorious for taking large amounts of time:

- browsing the web
- interacting in computer conferences and working in groups
- getting to grips with a personal computer.

What response do you have to students' complaints about overload on this course?

Course Chair's response

Module one in particular was somewhat overloaded in that, as an activity based

module, many activities (particularly computer related ones) can take much longer than anticipated, particularly if you encounter a problem. As I have mentioned we have taken steps to reduce some of this load in module one for the 2000 presentation.

You are correct in that many activities included in the course, such as searching the web, using computer conferences can be quite open-ended activities. New learners in particular can spend a disproportionate amount of time on such tasks. However, the course has clearly been successful in teaching IT skills at a distance, and this is evidenced by the work the students produce at the end of the course, and the feedback they have provided. For the 2000 presentation instructions to students have been refined further and several time-saving options made available for them, for instance the provision of a standard template they can use for creating their group web page.

This returns us to our initial point in some ways, that of the need to retain academic credibility. Academic credit is awarded for the nature of the task, not the time taken. So for instance, if a student has spent a long time reading conference messages from other students, whilst this may have helped their understanding of the concepts, it is not activity which replaces the core course work.

The amount of time put in by students should not always be viewed as a negative factor. In many cases this reflects their enthusiasm for the course and the web in particular. This was often exhibited in the resources they had located for the assignments and the design work put into them. This was not necessary to complete the assignment, but in doing so the student made the learning experience more rewarding and meaningful.

UKOU students often have busy lives apart from their study, and fitting in a course can be difficult. This is particularly true of entry-level courses, where many students are new, or returning to study. The course contained a lot of material on developing study skills, such as critical reading, clear thinking, effective writing and so on, but this is maybe one area where we could help students further by giving them advice on the sorts of 'survival tactics' students tend to develop after one or two successful courses.

Workload is a factor we will have to continue to monitor; we also need to balance carefully the feedback from students and the academic demands necessary for a level one undergraduate course.

7. Using student feedback in revising the course

Reading though all the feedback data from students and tutors is like standing at the apocryphal Spaghetti Junction and watching cars going every which way. Some students call for more group work; others want none at all. Some are disappointed in the course content; others find it the perfect marriage of both vocational and academic skills. Advice fumes the air.

At a general level, several common responses do emerge however:

- that students have enjoyed the course tremendously
- that it is a lot of work for both tutors and students
- that the systems, procedures and framework of the course have functioned successfully (e.g. the web site, the electronic submission of assignments, the computer conferencing, and the course content generally)

So do you tweak the most unsatisfactory elements (e.g. reduce workload, improve

materials for new computer users) and sit back and bear the inevitable criticism from the students who do not like this or that element? If so, what value have you and the course team had from the evaluation data?

The course is innovatory for the UKOU in a number of ways:

- there is no provision for face-to-face tutorials
- the course content, apart from several set books, is entirely on the web
- the combination of ICT skills teaching to complete beginners, online group work, and very large scale online delivery (even by OU standards) is probably unique in the world.

How successful do you consider the course to be in achieving its original aims?

Course Chair's response

The most consistent feedback was that the preparatory period needed to be longer and that module one was overloaded, both of which have been addressed for the presentation in 2000, as well as the inclusion of a non-assessed group activity in module two. As you indicate, apart from these it was often difficult to discern a clear message. From the feedback of the students who completed the course, there is no doubt that the great majority found the course enjoyable and rewarding, for example 84% of respondents rated module two as enjoyable or very enjoyable.

What this indicates is that we need to be very clear to students what the course is, and as importantly, what it is not, about. The course descriptions have been modified now, to reflect some of the feedback from last year. Also the course guide, which all students receive in the mailing, states very explicitly a number of factors students need to be aware of pertaining to the course, including group work, the academic nature of the material, the teaching of study skills and the need to be online for substantial amounts of time. At this stage students can still withdraw from the course.

The feedback has been particularly useful in helping us modify specific activities. Perhaps more importantly it helps the course team form a picture of the students on the course, the issues which are important to them and the manner in which such a course can impact upon their lives.

In some of its aims the course has exceeded reasonable expectations, for instance in appealing to so many people, often new to studying and new to the OU. Some aspects we have only begun to explore, and will develop over the years. For instance, we can assume 100% attendance in asynchronous tutorials, and discussion is easy to generate in this medium, so the underlying pedagogy could shift towards a more discursive approach. One of the most interesting aspects this year was the range of quality of the assessments students produced, particularly their end of course assessment. This is one area where I believe the possibilities offered by the medium will make a significant difference to our standard practice. For instance it makes plagiarism easier, and at the same time it encourages students to find their own resources, to think about the design and structure of their answer, and perhaps to engage with the material in a different manner.

The UKOU has developed a model of distance education which works very well, and it has a reputation for good quality materials. Perhaps the main aim of the course team was to adapt this effectively to the Internet. The student and tutor responses this year, and the huge demand for the course in 2000 indicate that we have largely been successful in this aim. Given the nature of the material, and the ease with which it can

be updated compared to traditional print material, the course will continue to change throughout its lifetime.

Web courses at other institutions

How typical are the benefits and the difficulties we encountered on T171 compared with the experience of other institutions? In order to investigate this question, the results of three evaluations of web courses at other institutions are compared.

The first example is given by Hara and Kling (1999) of Indiana University in a paper significantly entitled, 'Students' Frustrations with a Web-based Distance Education Course: A Taboo Topic in the Discourse.' The authors point out that 'many advocates of computer-mediated distance education emphasise its positive aspects and understate the kind of work that it requires for students and faculty.' In their evaluation of a small web course offered by one of the major US universities, they uncovered a range of frustrations and difficulties students faced which actually inhibited their learning at both conceptual and affective levels. The main problems they identify were:

- lack of prompt feedback by the tutor
- ambiguous instructions on the web
- technical problems.

Furthermore, they noted that students' expectations about the course affected their satisfaction with it, when the materials or instructions diverged from their pre-conceptions.

In a second example, a graduate health services planning and policy course at California State University, Bakersfield, the evaluator (Alexander, 1999) reveals that promoting collaboration amongst the students was more problematic than anticipated and concluded that.

IT used in an exploratory/constructivist model provides excellent opportunities for collaboration... provided care is taken in promoting collaboration, and in presenting and structuring assignments around these communities. (Alexander, 1999, p. 22)

Other important findings were that:

- students need practical and applicable IT instruction and guidance in the learning process
- acquiring new IT skills is a time consuming task for students. (ibid)

A third evaluation of a web course comes from the University of British Columbia and concerns a graduate course on distributed learning. The evaluators, Bartolic-Zlomislic and Bates (1999), found that their course was overloaded and the work had to be reduced in subsequent presentations. Adjustments also had to be made to the conference structure and small group sizes, and the collaborative assignment provoked mixed reactions from students. Some students would have liked a more applied focus to the course and others complained of poor moderation, unanswered questions, and intimidation.

Nevertheless, the course was very successful overall and the value of online, asynchronous interaction, access to web resources, collaborative work and ease and flexibility of the web as a delivery medium created a rich learning environment appreciated by most of the students.

From this short comparison with other web courses, it is clear that the problems and the

advantages encountered by the UKOU in its web course are in no way unique and seem to be independent of the numbers of students, which range across the three external courses and the OU course from six to 900!

Conclusions

We have examined this innovative course from the students' perception of the issues raised by web-based teaching. The feedback from students indicates that the main issues were:

- the time it took to become competent with the PC, the Web and/or with computer conferencing
- the sense of accomplishment and satisfaction with the course and the experience it provides of the whole ICT world
- the appropriateness or not, of teaching ICT skills and of working in online collaborative groups.

The factors which most affect students' satisfaction relate to:

- the support of their tutor or other staff or students
- the amount of time, patience and motivation they have to devote to the course
- the extent to which the course content and presentation fit the students' expectations and learning style.

These findings are not inconsistent with the findings of other evaluations of web courses at other institutions.

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About the Authors:

Robin Mason is Head of the Centre for Information Technology in Education at the Open University. She is also Director of the Masters Programme in Open and Distance Education. Dr Robin Mason, IET, The Open University, Walton Hall, Milton Keynes, MK7 6AA Tel: 01908 653137 Fax: 01908 654173

Martin Weller is a lecturer in Telematics at the Open University and chair of the course T171: You, your computer and the Net. Dr Martin Weller, The Open University, Walton Hall, Milton Keynes, MK7 6AA. Tel: 01908 652915 Fax: 01908 653658

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Editor's Note: Learning style preferences play a role in success in distance learning and in the educational process in general. Diaz and Bontenbal use a short assessment instrument to check skill levels, study habits, and personal characteristics to appraise how successful the individual student would be in a distance-learning environment. This paper shares their theoretical constructs, implementation and research data.

Learner Preferences: Developing a Learner-Centered Environment in the Online or Mediated Classroom

David P. Diaz and Kevin F. Bontenbal

Abstract

Changes in learning theory have precipitated changes in the way we view students and the learning process in general. Constructivist learning theory provides a rationale for understanding and assessing student learning preferences.

Research has underscored the differences in student characteristics, especially between online and traditional student groups. Since students are likely to have different learning styles as well as other characteristic differences, teachers should assess their students and use the resulting data to help them design and implement instruction. Teachers can use a variety of tools to assess student learning preferences in the traditional and distant classrooms. Several Web-based communication technologies can be used to design learner-centered class assignments and activities. These tools can accommodate a variety of learning styles and even accommodate those learning objectives that require collaboration and discussion.

1. Introduction

For many years, educators have noticed that some students prefer certain methods of learning over others. These traits, referred to as learning styles by some, or learning preferences by others, form a student's unique preference for learning and aid teachers in the planning of group and individualized instruction.

According to Blackmore [1]:

> There are probably as many ways to 'teach' as there are to learn. Perhaps the most important thing is to be aware that people do not all see the world in the same way. They may have very different preferences than you for how, when, where and how often to learn.

MacKinnon [2] has noted the implications of differing student learning preferences. He states, "The wide range of individual differences surely must mean that there is no single method for nurturing creativity; ideally the experiences we provide should be tailor-made, if not for individual students, at least for different types of students.

The following article will describe how changes in learning theory have provided an important rationale for assessing student learning preferences. The authors hope to underscore that learners are indeed different, especially in the online classroom and, thus, have differing needs in the learning environment. The authors will describe these differences with special focus on the differences between traditional and online students. Finally, various examples of how teachers might assess learning preferences and other student characteristics and how online class assignments and activities might be focused toward student learning preferences will be demonstrated.

2. Learning Theory

Traditional education has historically been dominated by what we will generically term as "instructivist" learning theory [3].

Instructivism asserts that knowledge-besides being independent of, and external to, the learner-flows in a mostly unidirectional path, proceeding from the knowledgeable authority (teacher), or from instructional content, to the passive learner. Instructivism favors a teacher-centered, lecture-based (or other uni-directional) mode of instructional delivery and entails the assumption that learning takes place passively.

Educational learning theory changed markedly throughout the 20th century [4]. Dewey, in the early 1900s noticed that students who were interested in their subjects applied more effort to their studies. Similarly, the "curriculum experiments" of the 1930s, which promoted a curriculum designed to meet the future work needs of post-Depression-era students, also promoted a focus on student-centered learning. Subsequently, Thorndike encouraged "transfer training" that is, training that could be transferred to real-world workplace environments. These ideas, and others, helped to shape the concept of student learning preferences and paved the way to current learning theory.

At the present time, the adult learning theory paradigm is shifting from a teaching towards a learning focus [5, 6]. The "constructivist" learning theory asserts that the learner constructs new knowledge through a process of relating new information to prior knowledge and experience [7]. According to the constructivist approach, teachers become guides rather than dispensers of knowledge, and instructional practice places more importance on the role of the student in constructing knowledge. Thus, constructivist practice demands more active forms of classroom instruction that engage the student in the process of learning and that rely on student input for shaping instructional objectives.

3. Learner Differences

As teachers begin to take their traditional courses online, they often transfer their traditional experiences and methodologies, untouched, into the online environment. The underlying (and often unspoken) assumption is that the students must be the same, thus, methodologies that are successful in the traditional environment should also be successful online. This common notion also entails the assumption that classroom methods and activities must be appropriate for all students in all environments. The authors of this article challenge both of these propositions.

3.1 Learning Styles: A recent study by Diaz [8] demonstrated that online students exhibit significantly different learning styles when compared to their traditional classroom counterparts. The average or mean learning style scores of online (n = 94)

and traditional (n = 40) health education students on each of six categories of the Grasha-Riechmann Student Learning Style Scales (GRSLSS) are shown in Table 1. More information about this learning style instrument can be found in Grasha's text, Teaching With Style [9].

Table 1. Comparison of Learning Style Means by Category

Class	n	Independent	Avoidant	Collaborative	Dependent	Competitive	Participant
Online	94	3.57**	2.53	3.57	3.55**	2.36	3.74
Traditional	40	3.26	2.46	3.81*	3.82	2.48	3.79

Note. Learning style scores are based on a five-point rating scale that ranges from strongly disagree (rating of 1) to strongly agree (rating of 5).

*p < .05. **p < .01.

Compared to those students enrolled in the traditional classroom, the students in the online class had higher scores on the Independent learning style scale and lower scores on the Collaborative and Dependent learning style scales. A statistical test (i.e., t test) revealed that these differences between the two classrooms could not be attributed to chance; that is, they were statistically significant. The variations in average scores between the two classrooms on the Avoidant, Competitive, and Participant learning styles were relatively small and were not statistically significant.

The broad range of learning style scores across categories demonstrated the variety of learning styles in both groups and illustrated the diversity of the distant student as noted by Thompson [10]. An instructor, acknowledging these learning style differences, could plan learning opportunities that would emphasize the learning preferences of each of the commonly preferred learning styles (i.e., Independent, Dependent, Collaborative), thus matching teaching strategies with learning styles. Instructors could also design class activities that creatively mismatch learning preferences, thereby helping students develop weaker or underused learning styles.

Further, instructional strategies in the online class should emphasize relatively more independent and fewer dependent learning opportunities. This approach has practical significance given that instructors often complain of too little "class time" to devote to learning objectives. Armed with learning style data, instructors can more efficiently allocate instructional time to various learning activities.

Table 2 shows the values of the correlation coefficients for each possible combination of learning styles within the groups. Correlational analysis within the online group indicated that a higher Independent learning style score was significantly associated (negatively) with lower Collaborative and Dependent scores. Thus, not only were online students more independent than the on-campus students, but this independence was not tied to needs for external organization and direction from their teacher (i.e., dependence), or for a need to collaborate with their classmates. These findings suggest that online students can be described as "strongly independent," in that they match the archetype of the independent learner in terms of autonomy and the ability to be self-directed.

A second important relationship (positive correlation) was found between the Collaborative and the Dependent learning styles. That is, higher Collaborative scores were generally associated with corresponding high scores in the Dependent style. This correlation demonstrated that, though online students, in general, prefer independent learning situations, they are willing and able to participate in collaborative work if they have structure from the teacher to initiate it. In other words, independent learners, in this case, were not as strongly independent when functioning in collaborative learning

environments. This suggests that teachers should provide sufficient guidance when facilitating collaborative assignments/activities for these students.

Table 2. Intercorrelations Between Learning Styles Online and On-Campus Students

Scale	1	2	3	4	5	6
Online Students (N = 94)						
1. Independent	--	-0.13	-0.37**	-0.38**	0.16	0.10
2. Avoidant		--	-0.05	0.10	-0.01	-0.67**
3. Collaborative			--			
4. Dependent				--		
5. Competitive					--	
6. Participant						--
Traditional Students (N = 40)						
1. Independent	--	-0.20	0.1-	-0.12	0.13	0.09
2. Avoidant		--	-0.37*	-0.12	-0.01	-0.67**
3. Collaborative			--	0.27	0.51**	0.52**
4. Dependent				--	0.15	0.31
5. Competitive					--	0.46**
6. Participant						--
Note. A correlation coefficient varies from -1, 0, to +1. The degree to which it varies in either direction reflects the strength of the relationship of the two variables. *p < .05, two-tailed. **p < .01, two-tailed.						

In the traditional group, significant positive relationships were found between the Collaborative learning style and the Competitive and Participant style. That is, traditional students were more apt to be eager class participants and willing collaborators if it helped them to compete favorably in the class. The low level of independence displayed by on-campus students was not related to any other aspects of their styles as learners. Thus, independence was clearly a weaker learning preference for traditional class students.

3.2 Demographic Differences: Besides differences in learning styles, there were other differences between online and traditional students that underscored the diversity between these two groups. Table 3 illustrates some of these differences.

Table 3. Demographic differences: Traditional vs. Online

	Traditional	Online
Older Students: 22-50 years	49.3%	61.4%
White students	76.1%	81.3%
Completed over 60 units	8.5%	36.5%
Earned degrees	2.2%	7.3%

Demographic data in the Diaz study revealed that online students exhibited different characteristics when compared to traditional students. The White ethnic group was disproportionately represented in online classes (81.3%) compared to traditional classes (76.1%). The online students were decidedly older than the traditional group. Nearly 62% of the online students were between 22-50 years, compared to 49.3% for the traditional class. These results support the literature, which indicates that distance education students are older than their on-campus counterparts [10]. Further, online students were more academically experienced as evidenced by the fact that over 36% of the online students had already completed more than 60 college units, compared to only 8.5% of the traditional students. Online students were also about 3 times as likely to have already completed a college degree.

Thus, there seems to be sufficient evidence that distance education students will display different characteristics than their traditional counterparts. Given this assumption, it is important to understand how student characteristics might be assessed and how this information might impact instructional design and implementation.

4. Student Assessments

Assessment instruments are an important way of determining different learning characteristics and of gathering other pertinent information about students. These instruments can reveal information valuable to both the instructor and student and can be found in the form of questionnaires, readiness surveys or learning style inventories. For an instructor, information gathered from these assessments is particularly useful in designing assignments that meet different student learning styles. If optimal student learning is dependent on learner preferences, and these vary between distance and traditional students, then instructors should be aware of these differences and alter their preparation and instructional methods accordingly. Students can also benefit from these assessments by discovering their preferred learning mode, and by determining the types of learning situations in which they would be most successful, given their particular learning preferences.

In a constructivist-learning model, assessment tools are essential. If students are to play an important role in learning, the instructor must seek to understand the students and their preferences for learning. Learning is facilitated by helping students to understand their learning preferences and by providing them sufficient opportunities to meet those preferences. It is important to use assessments at the onset of a learning situation so the instructor is better prepared to guide the student through the learning process and the student is better prepared to make decisions that will lead to successful outcomes.

4.1 General Questionnaires/Surveys: One way of gathering information about students is through the use of general questionnaires and surveys. Questionnaires can be designed in several Web-based formats for easy delivery. An instructor may use a questionnaire to garner student perceptions on assignments, learning situations, or self-perceived expertise with various technologies. They might also collect data regarding

hardware, software, or ISPs used by the students. This information might help instructors to author their educational products to the "lowest common denominator" and/or to set class minimum technology standards.

4.2 Student Readiness Surveys: Student readiness surveys can be a powerful tool in assessing student readiness for a particular learning modality. With the proliferation of learning environments on the Internet today and the increased use of technology-mediated instruction, readiness surveys provide a good way of determining if a student has the necessary characteristics to be successful in these new learning situations. For example, surveys can check for technical skill levels and comfort with technologies, study habits, and other personal characteristics that are germane to learning situations.

An example of a distance education self-assessment survey designed by Bontenbal and Diaz (http://library.cuesta.cc.ca.us/distance/survey.htm), demonstrates how a readiness survey can be used to help students determine if they would be successful in a distance education setting. Upon completion of this short ten-question survey a window is displayed giving the results of the survey and an appraisal of how successful the individual would be in a distance education environment (Figure 1).

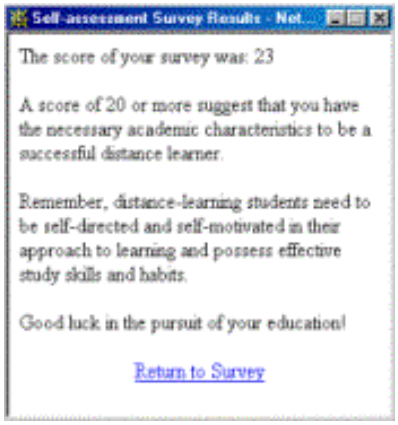

Figure 1. Distance Education Self-assessment Survey Results

Readiness assessments can inform students of their strengths and weaknesses in particular learning situations. They can also help instructors guide students through different learning modalities.

4.3 Learning Styles Surveys: Of the different types of student assessments described, learning style surveys could arguably be the most valuable to student success and the educational process in general. Tony Grasha has defined learning styles as, "personal qualities that influence a student's ability to acquire information, to interact with peers and the teacher, and otherwise participate in learning experiences" [11]. There are several different kinds of learning style inventories available and each can help in understanding the different aspects of a student's preference for learning. The Grasha-Riechmann Student Learning Style Scales (GRSLSS) is ideal for assessing student learning preferences in a college-level distance (or mediated) education setting. First, the GRSLSS is one of the few instruments designed specifically to be used with senior high school and college/university students. Second, the GRSLSS is a relevant scale to use in a distance education setting since it addresses one of the key distinguishing features of a distance class: the relative absence of social interaction between instructor/student and student/student. Third, the GRSLSS promotes an optimal teaching/learning environment by helping faculty design courses and develop sensitivity to student/learner needs. Finally, the GRSLSS promotes understanding of learning styles in a broad context by spanning six categories. Since students possess all of six learning styles to a greater or lesser extent, this system of classification prevents learning style stereotyping and provides incentive for growth in underused learning style areas.

An online JavaScript-based application of the GRSLSS developed by Diaz and Bontenbal can be found at http://library.cuesta.cc.ca.us/distance/new/lrnstyle.htm. This particular version of the GRSLSS is useful because it gives the student immediate scoring of his/her survey and provides extensive feedback and interpretation of the various learning styles (Figure 2).

Further, this survey's ability to submit results to an instructors e-mail, or store results in a database, make it a valuable tool for course design and management.

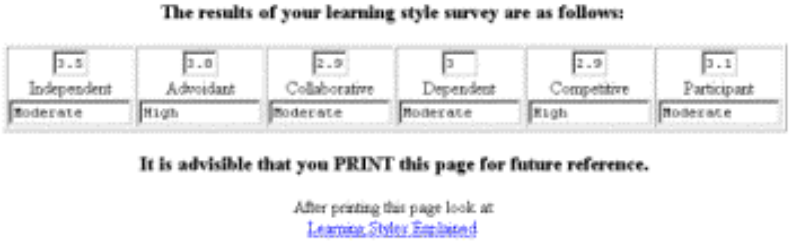

Figure 2. Online Display of GRSLSS Results

5. Assignments/Activities

The type of assignments/activities that are used by an instructor, and thus, the technologies selected to support them, are ultimately based on the preferred learning theory of the teacher. As we have stated elsewhere [3]:

> ...we view learning theory as a continuum between instructivism on the one hand, and constructivism on the other. The extent to which teachers see themselves as instructivist versus constructivist, implicitly determines the extent to which classroom activities are based on teacher or student preferences, and guides the selection of instructional technologies.

In turn, the preferred learning theory of the instructor may be based on several factors, including: learning style, teaching style, personality type, teaching discipline, etc. Whether teachers choose instructivist or constructivist activities for the classroom, there are appropriate technologies to assist them. An instructivist approach to teaching/learning promotes two predominate types of communication in the classroom: teacher-to-student, and content-to-student. The activities and assignments generated by instructivist approaches usually are unidirectional and typically place students in a passive learning role. Instructivist delivery modes can include posting online lecture notes and creating independent study assignments using the Web. Teachers can make these activities more compelling and interactive by including hypermedia such as audio, video and graphics, Flash, and/or Virtual Reality Modeling Language (VRML). Multimedia presentation software, like PowerPoint, allows the user to export a presentation as a series of HTML files (Figure 3), including notes and/or narrative. One can also export the presentation as a video file.

Figure 3. Screen shot of PowerPoint exported as HTML

Constructivist learning theory, on the other hand, places a premium on the students' active role in the learning process.

Constructivist practice facilitates reciprocal communication and a more balanced participation between educational participants.

Several technologies within the realm of the Web can facilitate self-directed, active, and collaborative learning as well as meet the challenges of educational delivery to the online learner. Several forms of synchronous (real time) and asynchronous (delayed time) technology can provide interaction between teacher and learner that is

stimulating and that meets the needs of the learner.

Information can be delivered in a variety of forms. Synchronous technologies (e.g., "chat") can create and maintain a sense of 'community' that is crucial for many college students. They can be effectively used for small groups and for office hours but can be difficult to manage when attempting to facilitate larger group discussions. As a result, we do not recommend that you employ synchronous technologies as the mainstay of your class collaborative or discussion activities. Further, synchronous technologies require students to be at the same virtual place at the same time. This offsets one of the main desirable features of an online class: namely that students can access the class at any time they choose. As synchronous technologies become more commonplace, cheaper, and as the Web infrastructure grows to better support them, they may become worthwhile tools for facilitating collaboration in the virtual class. Until that time, it would be advisable to limit their use to options for virtual office hours and small, optional study groups.

Listservs and threaded discussion boards are asynchronous forms of communication. That is, students need not be present at any particular time to use these technologies. A listserv is useful because it employs a metaphor that is readily understood by most students: e-mail. Thus, listservs keep students in a familiar environment and, in many cases, obviate the need for technical support.

By simply checking their e-mail, your students will receive notifications from the class. This makes the listserv useful for sending class announcements (especially those that must be acted on immediately) and for addressing questions that might apply to all students. Teachers can set up mini listservs for facilitating small group discussions. By including yourself as a member on these mini-lists, it is possible to keep track of the discussion for each group. Listservs tend to be more difficult to manage as the group grows. Since every message to the list goes to everyone on the list, as more students send messages the messages will tend to backlog. This makes it difficult to ferret out topic threads and for archiving. If a listserv is used for discussion and collaborative activities, be sure to keep the groups small and teach students how to archive messages (i.e., using "mail rules") in their e-mail client software.

Threaded discussion or message boards allow students to post a response to a topic or question that is then viewable by all students immediately after it is posted. This is a simple and effective way of visualizing topic threads and for having access to archives of different threads. As with listservs, students have time to consider their posts, and correct spelling and grammar errors before contributing their posts.

Real-time "chat," "instant messaging," "threaded" discussion and listservs are interactive and bi-directional modes of communication. These technologies can be used to facilitate learning activities that are active and that address collaborative learning styles. Together, these technologies represent an innovative and potent force for educational delivery over the Web [12].

6. Summary/Conclusions

Changes in learning theory have created the need to learn more about our students and to put that knowledge to work in the design and implementation of our classes. There are likely to be a variety of differences between traditional and technology-mediated, or distance education, students. These differences should be accounted for and addressed in designing and implementing traditional or distance education. By using Web-based surveys, questionnaires and inventories, an instructor can discover a wealth of information with respect to student learning preferences and other student

characteristics.

New communications technologies can accommodate all student learning preferences including those whose objectives require discussion and collaboration. Teachers will need to learn more about and become familiar with the use of these new tools to determine their potential efficacy in the classroom.

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About the Authors:

David P. Diaz, Ed.D. is a Faculty Distance Education Mentor at Cuesta Community College, P.O. Box 8106, San Luis Obispo, CA 93403-8106. His email address is davidpdiaz@earthlink.net

Kevin F. Bontenbal, M.L.S. is Instructional Technology Librarian at Cuesta Community College, P.O. Box 8106, San Luis Obispo, CA 93403-8106.

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Editor's Note: Here is a thoughtful analysis of how to effectively integrate fundamentally different technologies. This is well worth exploring by both education and industry.

SIDEBAR - CD/Web Hybrids

David P. Diaz

So called "Browser based" CD-ROMs are technically referred to as CD/Web hybrids. I have used CD/Web hybrids for several years. My research on pros and cons of CD/Web hybrids is published in: "CD/Web Hybrids: Delivering Multimedia to the Online Learner. " It is the eighth article listed at: http://home.earthlink.net/~davidpdiaz/LTS/sitepgs/ltsdocs.htm

A friend of mine, Dr. Reid Holland has devoted some of his research to CD/Web hybrids and has a nice informational web site: http://training.mid.tec.sc.us/hybrid/

Reid and I presented at the California Virtual Conference this past year in which we demonstrated two different implementations of CD/Web hybrids. His was for teaching history and mine for teaching health education.

It is the "hybrid" nature of these discs that keep them from the death knoll of talking head syndrome. Because they can utilize web technologies, they can facilitate interactivity through links to listservs, message boards and other synchronous or asynchronous technologies.

A teacher still needs to design thoughtfully and reject too much passivity in the delivery of instructional content. I recommend keeping video lectures brief. Remember that when we lecture in a classroom environment, we take for granted the interaction and discussion that is sandwiched between the content portions. On the web, a lecture can become too passive from the student perspective. Thus, lectures must be condensed and the key points distilled. Students should not be made to endure 50 minutes of video.

David P. Diaz, Ed.D. davidpdiaz@earthlink.net, Faculty Distance Education Mentor, Cuesta Community College, 805-546-3215.

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The Writings of Guy Bensusan

Many of us have followed the writings of Dr. Guy Bensusan for a long time. Others are just discovering him. He is a frequent contributor to listservs, and freely shares his rich experience. Over the years, Education at a Distance has published many of his articles.

His philosophy and practice have continued to grow with the advent of new technology and the acceptance of distance learning as a viable and effective alternative to traditional methods of teaching. He is the master teacher, leading us into new paradigms of teaching and learning. Through his writings he takes us on a journey of exploration and discussion. He shows us how to motivate students and achieve results with anywhere-anytime collaborative learning that are the envy of most classroom teachers.

The Bensusan Method is enriching the lives of tens of thousands of students. Education at a Distance is grateful to have Dr. Bensusan present articles each month so that you, your colleagues, and your students can enjoy and benefit from his experience.

Thoughts on How

Guy Bensusan

Thinking about *why* we should do something is very different than moving into *How to Go About It*. The former is more conceptual and theoretical, a matter of philosophical questions and relationships. The latter is nuts and bolts, hammer and nails; we shift from postulate to formulate, and become constructivists, building activities for the classroom, not for us teachers, but for all the learners. We assemble assignments, tools, exercises, reinforcement activities plus assessments to prepare the learning pasture.

Pasture is a good word: an expansive field where everyone can do what needs doing, where the cheerful wrangler makes sure food and water abounds, and lets the rest happen. A learning field has four traits:

1. The learners themselves must do the reading, talking, writing, interacting, revising, arguing, and so on. The teacher cannot and should not try to do it for them because that will hinder the process. The teacher should be accessible for help when asked, but otherwise should just be there for support, encouragement and frequent smiles.
2. Learners must interact. They have done it for years and need to continue in a safe, competition-free place, with minimal regulation and control. The pasture is

fenced, so let them roam across it to do what they need to do in the space and time they need.

3. Learners will learn at their own pace, which comes from within. They will do so when allowed to and will often help each other through tough spots. Efforts to hurry them along will not improve what they do, and trying to drive the herd means you will lose many of them.
4. Learners are not equals and the pasture is uneven. Let them forage where they are most comfortable. Learning takes time, perhaps the whole term to learn, build, make mistakes, recast and fine-tune. They can be judged and weighed after the term is over. What counts is at the exit.

These four guidelines lead us to **The Twelve Pillars**:

STRUCTURE

1. Use various out-of-class alternatives for transfer of course content

2. Create useful tools and visual models to awaken ideas and connections

3. Help students investigate; ask questions to denote/explore relationships

4. Use many revisits for idea reinforcement rather than a single immersion

ACTIVITIES

5. Design learning experiences for students to engage in during class time

6. Formulate individualized assignments in several ascending steps and levels

7. Organize and implement multi-level, cooperative, mutually helpful feedback

8. Develop after-class exercises where students can interact, build and learn

RESULTS

9. Use portfolios so students accumulate evidence of their learning growth

10. Establish options to help students cope with access limits and inequities

11. Reward GROWTH; convert misdirection into beneficial learning moments

12. Build grading on personal effort, persistence, evolution and enlightenment

The underlying purpose of the pillars is to shift the emphasis away from us as experts and away from the ever-larger volume of content in our respective disciplines, to focus more attention on how to help learners of varied abilities to move forward and upward successfully in their power to LEARN.

Based on more than four decades of teaching, including seventy fully-interactive comparative arts and humanities courses over television to multiple sites, I have concluded that if each of us would include our own adapted version of all of the above steps in our courses, traditional or innovative, we would help bring about a genuine learning revolution. It would mean some hard struggle on our parts to throw out many habits we are comfortable with, but which are in truth inconsistent, contradictory and counterproductive. It has taken me over ten years to get to where I am now; I had to invent all of my own practices and then test them for each course. There is clearly no

"quick fix" for the process, but it may be that each teacher who wants to make this transformation will no longer have to invent the whole wheel. What has been done here may serve for individual adaptation.

The first step in class is to get away from trying to give them only what we know; we can describe milestones and provide maps and travel hints, but they must make the journey for themselves. As brilliant as our lectures may be, they are ineffective with unsophisticated or inexperienced lecture-listeners; students need to read, to see, to hear, to gain the necessary information before they come to class, so that they are pre-prepared to interact in several levels of comprehension beyond data and information.

We need to give them smaller chunks or bytes of information, and even more important, adequate time to "let it all soak in." This does not mean that students are to learn less --- it is clear that in our world we need to know MORE, and it is also clear that the US is no longer the "world leader" as regards subject matter. However, the point is that learning is a process and not a quantity, which means that, for better digestion (as Mother used to say) you must take smaller bites.

The teacher is already familiar with the material by having learned it. Students must be given the opportunity to go through the same process to gain familiarity, to learn how and why this is more important than that, to see how the taxonomies and categorizings exist and work. Students cannot learn to avoid mistakes or learn from them if they are not allowed to make them --- the function of the learner-helper in that situation must be to help with analysis and formulation of coping tactics and methods.

Nor will they learn it all in one sitting. We have to revisit and reinforce, and they must go through the same kind of thing, climbing the ladder a rung at a time. Nor will they learn in the precise order you might want them to; what is logical and reasonable to one person does not work for another, and it may be a bit difficult and frustrating to stand and watch a learner do what needs to be done in a way you think is inefficient and ineffective.

But they can do it, they can get beyond where they are, all of them, in their own ways. They will each be starting at a different place, and none will finish the course at exactly the same spot. But each will have grown, and that is what counts, both for them and for you. If they have been given the tools and experience in using them, they will have been affected for the rest of their lives. An analogy might be a bicycle with training wheels; first they ride with them, then without them, and only at that point does it become useful to start talking about alternatives for and improvements in efficiency.

If the idea of no numerical benchmarks for grading evokes uneasiness, design a pre-test, or present a significant concept on the first day, and ask them all to write down their thoughts about it immediately, sign it, date it, and put it in their portfolio. Do it again with the same concept at mid-term and at the end. Just before the course is over, ask the students to read them in sequence, analyze and compare how the later ones differ from the first. That helps them learn to evaluate themselves, which is vital in their quest for independence. As teacher, when you read them, you will perceive what they have seen, and it gives you another area of common ground for discussing their growth -- one they clearly will understand.

With traditions across the disciplines being overturned by new evidence, with countless new meanings and interpretations becoming part of scholarship, and with multicultural, international and gender perspectives giving us new ways of looking, we are entering new frontiers and we will never again be the way we were. Our measuring sticks are changing, if they have not already changed without our being aware of it. I doubt any

of us can predict the future of our disciplines and technolinks with accuracy.

In the classroom, it becomes valuable to indicate many alternative paths and allow learners to choose what they want, and then encourage them to move along at their own rate of comfort, ability and style. Here is where patience and pre-prepared learning tools for them pay off. Many of the ones I have used are described in Chapter A-2. You can expect reluctance at first --- many students are deeply conditioned to dependency on the pulpit and its attendant expectations. Do not be surprised when they beg to be told the specific rules and formulae to follow. They'll even ask for the answers they should memorize for a test!

They will work much harder for themselves than for you. When you turn the learning over to them instead of controlling it yourself, they will not fully believe you for awhile, because they have heard promises before. They will keep watching and waiting for a display of authority, a "pop quiz," or some symbolic act betraying your deception. They will also struggle and curse as they abandon the traditional highway, and may get lost without some alternative "sketches and structures." As you smile, support and encourage, some will traverse the unknown, gain reward and elation, returning with eager stories of their odyssey to pass on to the rest; it is worth class time to hear and talk about these.

Students will help each other, share materials, read each other's work and offer suggestions, especially if the grading policy focuses upon individual growth, making it clear that helping others does not reduce one's own chances for a top grade. Asking several students to discuss aloud their responses to the changing "truths" and schools of thought is very valuable. It helps them see alternative views, and keeps you in constant touch with where they are in their learning.

A most important key to success is to refrain from saying, "you are wrong." The minute that is stated in the classroom by an authority figure, open discussion will taper off and may even cease. In an ambiance overshadowed by grades, it is important to provide a safe harbor. Wherever they may have gone astray, it is important for them to discover it. It is far more useful for all of the learners if you respond instead, "that is one view of it; what assumptions do you think it is based on?" --- followed by, "do you see any implications in that interpretation?"

This idea of not letting grades get in the way of learning is vital. The portfolio system works best if you can lay out a series of steps (with BROAD guidelines) for them to follow. Set things up so each assignment builds on the previous one and anticipates the next, suggesting of course, that you have thought these out, built them into your syllabus, and structured your assignments so the students can go off on their own. Then move aside, out of their way --- though not too far! As the cook says, "if you hover over the soup, it will convey the taste of your anxiety."

When I started back in 1950, I thought my job was going to be that of teacher, instructor and professor. I find instead that I am a guide, planner, foreshadower, and fellow-inquirer with many questions that always evoke more questions, instilling in the learners a set of habits relating to their individual way of moving ahead, forward from where they were. Whereas I used to find pleasure in the applause that followed my finely-honed lectures, I now gain far deeper reward and satisfaction in being the helper --- organizing the field of play, watching the meandering plots unfold, keeping them from going out-of-bounds, enjoying the successful creation of the students' projects for which, believe it or not, they try to give me the credit!

Finally, I offer this mnemonic device for learner-helpers: I call it:

The "S" Curve

SET THINGS UP

START THEM OFF

SUGGEST SOME CHOICES

SURMISE

SUSTAIN

SHOW EXAMPLES

STIMULATE

STEP OUT OF THE WAY

SUPPORT & SMILE

STAY NEAR

Thoughts on Why

Guy Bensusan

One of the longest-standing educational traditions that I can remember is of the teacher walking into class with his manila folder of lecture notes, writing some appropriate terminology on the blackboard (which has changed colors and has even now become an electronic pad!), wait for the bell (which dates me), and then say, "Good Morning," and begin his lecture. I watched the scene for many years and then did it myself for many more.

So just as in the old days, the still-Pavlovian (Neo-Post-Pavlovian?) students chatter away until it is time for the lecture, as noted by the beeps on their watches, at which time they fall silent in their designated seats in neatly arranged rows, with notebooks open on the desk and pens or pencils in hand, poised and ready to record the information.

Of course, with student life being theater, just like most of real life, an occasional bountiful and bedecked beauty (or sartorially substantial stud) will make the grand entry, upstaging the lecturer for a moment --- pausing at the doorway long enough to make a splash, but not so long as to irritate the teacher (unless, of course, his or her mood was overcast to begin with). A few more late arrivals will slip in the back door, take their seats unobtrusively and begin to write. Modernizing technologies have replaced paper, pens and pencils with audio-cassette recorders, laptop computers and even videocamera, but apart from that, conventionally-expected actions will occur in the habitually-expected manner, and with routinely-expected results.

In one sense, there is nothing really new and unusual here. I recall, back in 1950, being the proud possesser of a brand-new Webcor wire recorder. It was the size of a portable typewriter (assuming one can remember what that was) and weighed about twenty pounds. It used half-hour spools of wire, which meant carrying the extras around in a bag (since matched carry-cases had not yet appeared as part of the purchase package), and an attached ceramic microphone with a long cord.

The microphone had to be held up by hand, facing the lecturer, and one had to sit

within the first two or three rows to be sure to pick up the words being spoken. The recorder operated on alternating current which meant I always had to be one of the first students into that classroom in order to sit close to the wall-socket (which additionally meant that I needed to carry an extension cord around, just in case). Ah, with Energizers and Duracells, the primitive days of yore are gone forever!

At the time, only two of three of us had such futuristic (though pre-space-age) equipment, and it made us the center of peer attention. Students would gather around us after class in the dormitory lobby (was that our motive?) and we would listen to the lecture and marvel, "what will they think of next?" I am certain the content of the lecture was not the attraction, but rather the novelty and faint potential of liberating us enslaved students from the onerous, demeaning task of taking notes by hand. Even then I wondered why the professor did not have his lectures typed out or printed in outline with factual details, so that we could really listen, think about and follow what he was saying while he talked, and afterwards in our dorms.

Today, though, the world has modernized, miniaturized, materialized and methodologized. We can sympathize with the lecturer, since with our new battery-operated appliances, we can experience the conditions in a large group of students in an amphitheater classroom. There may be as many as four hundred cassette recorders from all over the globe, or four hundred laptop computers, each with its keyboard clicking away. The noise level they generate now forces the teacher to use a public address system so that his lecture, often assisted visually by PowerPoint or some other presentational software, can be heard over the clackety racket.

In their search to avoid "unnecessary" work-time, the more creative students have already figured out that if they establish collaborative groups, they can send one member to class each day to record the information while the rest sleep, work on projects or attend to other duties. After class, the student returns to make copies for the others, either by printing them out, dumping the contents on floppy discs or, if s/he has a cellular phone, modem and the proper connections, can even transmit the information to everyone else's laptop by e-mail.

When test time comes, of course, the hall fills up as everyone (plus a ringer or two) comes to make their marks in appropriate places on the bubble sheet, while proctors check identifications and hover. Would this behavior system not make an amusing study for an anthropologist, if only to demonstrate the tragic waste of time, effort and money?

Class time is of extremely high value. If, as has previously been suggested, we consider class time from an accountant's perspective, we can calculate how much travel and energy (both fossil fuel and human, plus wear and tear on cars and the contribution to pollution) and number of hours (even if only at the minimum wage), have actually been expended to bring all the students, helpers and teacher into one classroom at a specific time. Add these up and the total number of dollars is astronomical! And what purpose does this ritual serve? Yes, each student can take notes --- a practice based on the theory that the act of writing something down commits it automatically to memory. Now however, the new technology can be used to fly far ahead of the old ways, somewhat like the astronaut on the old nag.

Students have taken the bit in their teeth, so to speak, and found ways collectively to magnify their learning efficiency and capability, almost as if there is a cumulative effect. That is, burgeoning technology is eagerly sought after by so many, and is so easily assimilated, that self-learning seems to expand much faster and in more directions as technology becomes more and more accessible. The contradiction is that they must wait, sometimes impatiently, for the old nag and rider to catch up, before

they can take their next major leap into learning!

A certain truth exists about writing, nonetheless. If we want to memorize factual information, it certainly does help to put it into the appropriate portion of the brain if you look at it, say it, think it, write it, hear it, and then revisit those steps several times. When I was first learning my Latin American History dates back at UCLA, that was the process I used. However, the memorization is only one small part of the larger picture. During the past fifty years, many aspects of life have changed. There are more facts now, and we have rapidly moved to deconstruct disciplines like history into a variety of sub- and allied fields, each dependent on a particular set of assumptions or way of thinking.

Thus while the facts, or at least some of them, remain important for certain aspects of study, many additional levels of comprehension beyond factual knowledge are more important for students today as they move along the path of awareness about perspectives, ways of seeing, slants of interpretation, purposes for guiding thought, and ultimately, some sort of wisdom about life. The real snag is that our institutions and faculty are so totally integrated to the historic rites of a teacher providing information to the students at a specific time and in a specific way, that we fail to examine the actual effect and implications of what we continue to do, and thus do not seek out alternatives which might revolutionize learning and learner-helping.

Various studies by sociologists and educators do call attention to this dilemma, while alternative educational institutions (often private) spring up to attract large numbers of students dissatisfied with current workings of the system. Guides to degrees by non-traditional paths via correspondence, e-mail, virtual universities, computer networks and other new technologies abound --- for instance, Bears' Guide to Earning College Degrees Non-traditionally by John and Mariah Bear --- and many institutions are slowly becoming aware that in the emerging market of consumer or client-driven education, it will be necessary to change procedures and tactics if they wish to survive the next decades. But institutional change is painfully slow, and the outcry that blasts out at any cyber-learning innovation that offers non-traditional courses toward degree programs is, "Are they fully accredited?" Perhaps in the forthcoming age that will not be a significant matter.

If we summarize these, we can compile them into an interesting list of practices that, in the eyes of many, are counter-productive to learning and only serve to reinforce tradition. The traditions are:

1. The teacher performs regular lectures, defines, makes assignments
2. Data is dumped in class; students take notes, ask occasional questions
3. Emphasis is on information, content, as told by the teacher or text
4. Teacher organizes the flow, substance, schedules, priorities and pace
5. Periodic tests given (usually objective, and on information accuracy)
6. Students do "all-nighters" for short-term memorization of specifics
7. Everyone takes same test, same time; proctors hover to detect cheating
8. Points accumulate, extra-credit, the curve emphasizes competition
9. Factual approach outweighs author-bias, analysis, comparison, concept interpretation and evolution of viewpoints and meanings
10. Minimal flexibility, deadlines, dependencies, equal treatment of unequal individuals of varying majors, cultures, learning styles

Some of the unfortunate consequences of this decalogue can be listed in the following manner:

1. Perpetuates the didactic hierarchy and also the authority and control of the teacher
2. Students remain passive, recipients rather than participants
3. Grade competition discourages cooperation, networking. exploring
4. Scores are emphasized over learning and long-range growth
5. Information and data transcend contexts and perspectives
6. The course is a challenge to surmount, not a building block
7. Internal focus is stressed, rather than lateralization, extension
8. De facto course goals tend to be short-range and immediate
9. Student waits dependently on the teacher for all activities
10. Little attention is given to useful, transferable principles

All of these devaluate the basic purposes and foundations of lifelong learning; they diminish the opportunities for independent growth by students, they negate (or fail to point to) many connections among all areas of human-environmental existence, they diminish the individual and his/her growth potential, and in their emphasis on one or two particularist points of view, they depreciate the validity of the multiple cultures which we claim so piously to value, and which are important to the members of those groups in our civilization who are also citizens, pay taxes and should have equal rights and responsibilities to all of society's benefits and blessings.

Combining testing with learning begets unclear goals; the goals are unclear to the students and also to the teachers, administrators, parents, employers and onlookers. When learning and grades compete, grades win! Does a fundamental conflict of interests eventuate when teachers are responsible for the grading as well as for helping with the learning? Somehow, this overlap is similar to the fox guarding the hen house.

But let us change our focus and our intentions. Let us go back to our teacher in the classroom with the four hundred student laptops, and see if we can brainstorm some options that might lead us in other, more productive directions. One would be for the teacher to put the lecture on a floppy-disc and provide it to students as part of the course-pack. Another is to have all or as many as possible of the students on-line, so that the lecture can be given from the teacher's office at the university or even from his or her home. Oh, but that infringes on two other old traditions --- the teacher is supposed to be "at work" from eight to five!!! And, all students are supposed to do the same thing, except for night courses!!!

Is the effort to change our educational system confronting a huge "house of cards," of interrelated cards? Is it that we cannot change one thing without changing a whole series of laterally dependent other things? Each item relates and in some cases hinges on many others --- which is clearly part of the problem. If we stop giving the lecture by delivering the information in another fashion, then what happens to the lecture hall? Does it sit idle, or do we use it for another course or turn it into a theater? And what about all of the related services, textbooks, photocopy, custodial, maintenance, building security, traffic flow and parking lots, and so on. Everything is related to everything else.

Regarding the requirement that all students do the same tasks, as for instance taking tests or being on line; if any students cannot have access to computers, then should we not use computers? Why? Or rather, why not? If the students are all learners and the teacher has managerial skills or helpers with those capabilities, then why can't each group of learners function in whatever way they can, to get access to the learning-centered teacher? The lock-step mentality fits the teacher-centered model or

the content-centered model. If learners want to learn, let them do so, and grade them on their individual growth in understanding and application rather than on some arbitrary percentage of memorized material.

Many of our cultural assumptions and traditions clearly get in our way. We have always assumed, have we not, that students must be watched? They will cheat, won't they? Can we trust them to work unsupervised? We proctor their tests, assuming they will get the answers from each other. We prove their untrustworthiness by continually finding and publicizing incidents where such things happen. It is interesting to me that it is always the students who are blamed in that situation. It is their lack of morality and impatience for instant gratification, without performing the necessary hard work of learning that is criticized for the incident.

Maybe the sword has more than one edge. When competitions are established on a win-lose basis and the value of winning is so very, very high, incentives to seek short cuts and devious tactics are sure to be tempting. Perhaps we should look at some other sides of the picture, and possibly we can individualize the assignments and construct them in steps and stages to produce a special assemblage of learning which they can take ownership of, as well as pride, first in creating them and then in sharing them with course-colleagues. I have now done this for almost two decades, and have found no cases of cheating --- laziness perhaps, but not dishonesty.

Does not the same hold for the teacher? The current clamor over accountability, competence, tenure and abuse by teachers perhaps reflects the same major distrust of humankind. Can we really trust teachers to truly "work" from home rather than be at the office where schmoozing, sleeping or goofing-off will be overtly visible? Is it not ludicrous? We live in a day when businesses utilize various forms of flex-time for a wide group of reasons, some of them related to the changing demography of employees, the changing nature of the market, the effort to move into post-industrial thinking as well as concerns for the environment and the fact that new technologies make new methods possible. Can that not work just as well for students, teachers and universities?

We seem to be headed in new directions, and based on the predictions of futurists, tomorrow will differ greatly and ever faster from yesterday, while our emerging culture, always following way behind the technology, will have to bring up the rear. Old and unchanging institutions may decline, but also may be a haven for those who do not wish change. New ways of organizing and helping learners will come into existence and will have impact on large numbers. Where we are headed, exactly what life will be in twenty-five, fifty or even a hundred years from now is argued ferociously, and no one really knows for sure. We in colleges and universities need to formulate, develop and fine-tune a batch of new learning paths.

About the Author:

Guy Bensusan holds a Ph.D. in History from UCLA and teaches History, Art and Culture at Northern Arizona University. He is published extensively in the history and humanities of Latin America. In the mid seventies, he developed learning programs via radio, then videotapes for teaching at a distance. He was the first NAU professor to teach to multiple sites over Interactive Television.

In the past decade he developed peer-to-peer learning online with continuing online *communities of practice*. Thousands of students have contributed to the development of his Collaborative Online Learning Algorithm. His system is integrated into Geneva Software (the Learning Trust) and Roadmapping courses for Motorola, as well as the

learning tools of his former students who now teach at many levels. USDLA regularly publishes his writings on collaborative online learning.

Dr. Bensusan is Senior Faculty Associate for NAUNet, Online Learning, and Interactive Television and Professor, Department of Humanities, Arts and Religion at Northern Arizona University, Mojave. Email him at: guy.bensusan@nau.edu.

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TECHNOLOGY EXCHANGE

Fiber Installation Prepares Nashville Schools for Future

3M Telecom Systems Division

By installing fiber to nearly all of its classrooms, the Metropolitan Nashville Public Schools has prepared its classrooms to handle the next decade's highest bandwidth multimedia applications while solving interference and link length problems that bedeviled the previous copper cabling.

"What many people don't realize is that educators and students are power users," said Peggy Guy, Coordinator of Technology Service, for the Metropolitan Nashville Public Schools. "They need bandwidth and lots of it, especially to handle the new multimedia educational applications that are coming down the pike. Several years ago we realized that our copper network wasn't going to be able to cut it for much longer. Fortunately, we discovered that the prices of fiber cabling and network electronics have dropped to the point that we could install fiber for about the same price as overhauling our troublesome copper network. We got E-rate funding for the project and the rest is history. Now we can deliver streaming video to the classroom today and feel certain that we can handle whatever new applications are coming."

Metropolitan Nashville Public Schools is the 49th largest urban school district in the nation. The consolidated city-county district covers Davidson County, an area of about 525 square miles. Beginning in 1855, Nashville became the first Southern city to establish a public school system. Shortly before city-county government was consolidated in 1963, an educational researcher at Peabody College for Teachers introduced a revolutionary program for disadvantaged pre-school children. Susan Gray's program became the prototype for Head Start, the success of which has been well-documented nationally. Approximately 83% of Nashville's school-age children attend Metro Public Schools. Its students generally outperform national and large-city averages. A nine-member elected board and its appointed director of schools provide the leadership for Metro Schools.

Problems with copper cabling

Guy said that the original impetus to install fiber cabling arose out of problems the district was experiencing with the copper cabling that it had installed in all of its schools. "Copper cabling has far from the ideal properties required in elementary and secondary school environments," Guy said. "The first problem is that the schools tend to have a sprawling layout. The 100-meter maximum link length that can be achieved with copper means that multiple repeaters are usually needed to cover the required distances. Another problem is that the schools are loaded with older fluorescent lighting that often interferes with copper cabling. But most important is the limited bandwidth headroom provided by copper cabling. While category-5 cabling can handle

100 MB without difficulty, a lot of uncertainty still exists about its ability to handle future generations. Even if these issues are resolved, higher speeds will probably reduce the maximum link lengths to the point that the copper will probably need to be replaced anyway within a few years."

The Nashville district applied for funding through the E-rate or education rate program. The E-rate was established in the Telecommunications Act of 1996 to provide discounts from 20% to 90% on telecommunications services, Internet access and internal connections for all public and private schools and public libraries. The amounts saved through the discounts are to be invested in technology improvements. As of 1999, Tennessee schools had received a total of $6.3 million in E-rate funding.

"The universal service discounts will help bridge the digital gap between our wealthiest and poorest schools and bring the wonders of technology to those who otherwise could not afford it," former Tennessee State Education Commissioner Jane Walters said. "We are pleased to see that both urban and rural Tennessee school systems qualified for the discounts during the most recent waves of E-rate commitments."

Searching for a fiber solution

The next step was to find a fiber cabling system that would meet the district's performance requirements while staying within the limits of available funding. Guy asked Beacon Technologies, Nashville, to help them select a cabling system that would provide bandwidth for the future and rock solid stability at the lowest possible cost. Bill Hapner, CEO of Beacon, examined the available fiber systems.

"The Nashville schools had some experience in the past with an ST connector based fiber system," Hapner said. "But despite the high cost of that system, reliability was less than they had hoped. They were clearly looking for an alternative. Some of the problems in the earlier system were solved by using media converters from 3M to bridge the gap between traditional routers and switches and the new fiber cabling. These converters were just a small part of a complete end-to-end networking solution that the company has developed in the past few years. I suggested that they look closely into this system because it offers a dramatically higher performance to price ratio than traditional SC- or ST-based solutions.

The Volition Network Solutions from 3M consists of backbone and horizontal fiber cabling, VF-45" fiber optic connectors and high-density, low-cost networking equipment including workgroup switches, hubs and media converters. The Volition system's VF-45 connector is a two-part interconnect consisting of a plug and socket similar to the RJ-45 modular jack. The VF-45 connector takes about two minutes to install, terminates two fibers at once, and costs approximately $2.

The Volition system also includes fiber NICs, specialty patch cables, and all the products needed to install, or evolve toward a complete fiber optic LAN.

"Volition offers a dramatic cost advantage," Hapner said. "To terminate two drops with an ST system would require two connectors at $7 each plus a barrel at $5 for a total of $19. On the other hand, a VF-45 socket connector also terminates two fibers and costs only $2.64. There are also savings, although not as large, on cable, patch cords, patch panels, etc. In addition, it would take about 4 minutes to install two ST connectors while we can put in the VF-45 in 45 seconds. Overall, the total installed cost of a Volition system is well under 50% of a traditional fiber system and not far above what it would cost to install an equivalent copper network."

Hapner helped to specify a system that incorporates gigabit-backplane Volition 4000 switches as the core for each of the district's 49 schools, involving a total of 5,760

drops. The Volition fiber between the core and the classrooms currently runs 100 MB Fast Ethernet but could easily be upgraded to higher speeds simply by switching out the electronics. The majority of the classrooms are equipped with Volition 2008 dual speed mini-hubs that provide up to 8 10 MB or 100 MB ports. These switches in turn feed hubs in most classrooms that serve up to 300 computers.

"The fact that 3M Volition provided a complete product line from a single source that was designed from the ground up to work together was an important plus to the school district," Hapner said. "They didn't have to worry about vendors all pointing their fingers at each other when things didn't work. 3M took complete responsibility for everything, even down to the firestops. The small glitches that we encountered were resolved quickly by the excellent 3M technical support team." Beacon handled installation for 27 of the schools while four other vendors handled the balance using the same equipment.

An immediate positive impact

"Getting all of our schools connected with fiber has had the immediate and positive impact on our classrooms," Guy said. "Our students and teachers have begun to use a wide range of new high bandwidth applications that require streaming video and high-speed Internet access. It's been fascinating to watch. Once the network was installed, educators and students began discovering powerful new applications that put it to the test. I want to emphasize that business and the community doesn't always understand the tremendous need for bandwidth on the part of today's schools. Multimedia instructional applications are a natural for schools because, for one reason, they multiply the effectiveness of scarce instructional resources by allowing teachers with special skills to be in more than one place at one time. We are expecting to see a wave of new applications that will allow us to substantially increasing the instructional resources that we can put at the disposal of our students at a very reasonable cost."

"We have been very pleased with the performance of the fiber optic cabling and the support that we have received from both 3M and Beacon Technologies," Guy concluded. "Having a strong working relationship with our vendors is critical because we have never been staffed at a level that would allow us to perform develop the high level of technical expertise that we need. For example, we have many older computers in our classrooms that can't run networking cards faster than 10 Megabits. 3M worked with us to come up with a solution to extend the life of these machines with 10 Megabit hubs. They also worked with us to incorporate some of our older electronics into their network to save money. But the best thing about the new network is that it prepares us for a higher-bandwidth future. Over time, it will allow us to continually upgrade our networking performance without having to give a thought to recabling."

For more information contact: 3M Telecom Systems Division, 3M Austin Center, Building A130-2N-01, 6801 River Place Blvd, Austin, TX 78726-9000 Phone: 800-695-0447 Fax: 512-984-581. Visit the 3M Volition Network Solutions website at http://www.3M.com/volition.

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TECHNOLOGY EXCHANGE

Distance Learning Center Saves $100,000 Annually with Web-based Scheduling Solution

Scott Steinacher - TimeTrade Systems, Inc.

A network of seven colleges, The City Colleges of Chicago's Center for Distance Learning (CDL) offers affordable, quality education in 70 courses to more than 3,000 students. Until recently, CDL administrators faced a vexing logistic problem.

To successfully complete their studies, CDL students must pass periodic proctored exams administered on personal computers at one of seven colleges. Manually scheduling exams for thousands of students was difficult enough, but simultaneously tracking proctors, rooms, and computers was making the situation untenable and very expensive.

Recognizing the Internet's power to wring efficiencies from business processes, Pam Lattimore, dean of CCC's Center for Distance Learning, and her staff began looking for Web-based scheduling solutions. Their reasoning was straightforward. If people can order books over the Web, they should be able to self-register for exams online.

"We knew there had to be a better way," recalls Lattimore.

Using search engines, Lattimore and CCC's coordinator for distance learning, Peg Rademaker, compiled a short list of companies offering Web-based scheduling solutions. After meeting with representatives from several companies and looking closely at their products, the school chose a solution from TimeTrade Systems, Inc. in Massachussetts. With more than 100 customers online in a variety of industries, TimeTrade's solution had a proven track record.

"CCC's requirements are complex, but not unique," says Peter Hanson, TimeTrade's vice president of sales. "The colleges have a limited number of resources that must be made available to many students in a discrete period of time. Our solution was designed with these situations in mind."

At the start of the project, TimeTrade defined available resources, including rooms, personal computers, and proctors. After initializing a resource database with this information, the company defined and associated exams with dependent resources. Next, exam dates, start times, and durations were loaded into the system.

Despite its back-end complexity, TimeTrade's user interface lets students book appointments for exams in only four steps (see figure 1). After logging onto the system through the Center for Distance Learning's Web site (www.ccc.edu/cdl), students select their course, exam, campus site at which they would like to take their exam, and

desired exam date. TimeTrade then displays current availability in intuitive daily, weekly, and monthly views.

To register for exams, students simply click on an available date and time (see figure 2). Behind the scenes, TimeTrade tracks the number of students who have registered for each exam, then closes exams when as become fully-enrolled. In addition, the system sends automatic confirmations (see figure 3) and reminders to students via email, which has helped reduce the number of missed exam appointments.

TimeTrade's solution has many benefits. School administrators no longer have to field thousands of requests from students seeking to schedule their exams. Further, students can self-register for exams at any time of day or night, and in less time than would be possible by phone. And, because students receive confirmations and reminders via email, they are less likely to miss exams or arrive at the wrong date and time. TimeTrade's reporting module lets administrators monitor exam activities in real-time across all seven colleges.

To date, over 85% of CDL's students are opting to book their exam appointments online -- virtually eliminating phone traffic. As a result, CDL has been able to reduce payroll and other administrative expenses by approximately $100,000 annually, while providing better customer service to students. (Before the system, students occasionally heard busy signals or were put on hold).

"Scheduling multiple exams for over 3,000 students at multiple locations with a limited number of PCs available at any given time was a challenging task," says Lattimore. "TimeTrade has had a dramatic impact here," she concludes. "I don't know how we got by without it."

For more information contact: Scott Steinacher at TimeTrade Systems, Inc.
scott.steinacher@timetrade.com