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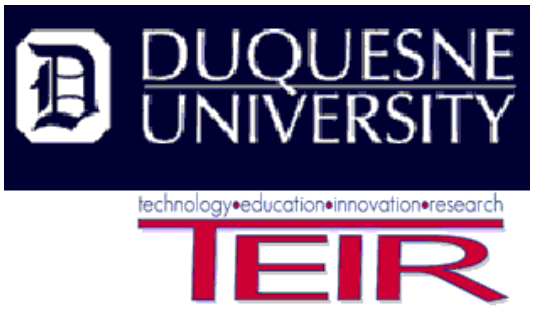

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This Journal was established to facilitate collaboration and communication among researchers, innovators, practitioners, and administrators of education and training programs involving technology and distance learning.

An academic institution, Duquesne University, was chosen for its commitment to academic excellence and exemplary programs in instructional technology and distance learning. Duquesne University is supporting the Journal through its graduate program in Instructional Technology and its Center for Technology Education Innovation and Research (TEIR Center). In addition to its educational programs, Duquesne University has major training contracts for industry and government.

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Table of Contents – October 2004

Editorial

Going the Distance

Donald G. Perrin

In the 1990s, proponents of distance learning searched for a name to communicate the power of learning at a distance. A new vocabulary was created embracing terms like open learning, interactive video, and online learning. Interactive web, peer learning, and learning management systems were developed to complement the logistical advantages of learning anywhere-anytime.

Academia was not impressed. Claims were made that distance learning was sub-standard learning. Some institutions rejected transfer credits for such courses. Extensive research proved otherwise. Academe, including the conservative Chronicles of Higher Education, accepted its validity and embraced distance learning.

Traditional faculty adopted email and computer based learning materials to support their classes. Faculty enjoyed the flexibility of web pages to deliver their pedagogy direct to students. Faculty training programs were oriented to use of technology.

Textbook publishers added CD-ROM and Web resources to deliver updated information, tests, and enrich on-campus and online classes with interactive graphic learning experiences. Competition developed among publishers to provide superb technology to sell their products. Powerful search engines gave faculty and students the tools of a research librarian. The web became a resource that dwarfed the Library of Congress.

Learning technology is powerful and transparent. Teachers can click their way to websites, bookmark significant materials, create PowerPoint presentations, and send links via email. Templates and authoring programs empower them to develop new learning environments and transform pedagogy and curriculum.

In the midst of growing success, black clouds rolled in.

The tragedy of 911 and the economic collapse that followed created a new reason for learning at a distance. Societal needs and growing student populations outstripped available budgets and classrooms. “No Child Left Behind” legislation was under funded, and budget cuts caused increasing numbers of undergraduates, graduate students and faculty to be “left behind.” Outsourcing jobs to other nations created a flood of displaced workers who needed training for jobs yet to be defined. Administrators and politicians seized upon distance learning as the solution to budget cuts, overcrowded classrooms, and the growing need for training programs.

Instructional designers and faculty who are steeped in the new technology are needed. The challenge for education is to make learning, whether classroom, blended or at a distance, into a relevant, rich, exciting, interactive experience.

We have the pedagogy, technology and expertise for this great mission.

We need funding.

Editor's Note: The second invited paper for 2004 comes from David Thornburg, a futurist and philosopher whose insights have guided corporations and governments for over a quarter of a century. Dr. Thornburg draws attention to the importance of storytelling to communicate concepts and culture, not only to our contemporaries, but to the next generation, His use of analogy and metaphors to clarify the role of various communication processes and environments brings us to realize that, like Dorothy in the Wizard of Oz, the answers we seek were always visible, but not necessarily understood – at least not until explained to us!

Campfires in Cyberspace:
Primordial Metaphors for Learning in the 21st Century

David D. Thornburg, Ph.D.

Introduction

Media are not interchangeable - a learner using the Web has a completely different experience from one watching television. Classroom presentations are fundamentally different from videos of the same class. As we use more and more electronic media in education, it is essential that we understand the unique nature of each expressive medium we encounter.

This article suggests that learning takes place in four spaces, only a few of which are honored in most schools. It offers new theory for educational systems based on four primordial learning spaces: campfires (information), watering holes (conversation), caves (concept), and life (context).

The theory is explored in a practical manner to show ways in which technology can bring balance back into our educational system. The utility of these four learning spaces is demonstrated in the context of the World Wide Web as an educational tool using a new framework for evaluating websites and other technologies as educational resources. The four spaces identified by Dr. Thornburg are used to create an educational system geared to the needs of learners and educators.

In the beginning…

The existence of learning communities probably predates civilization. As we embark on our great adventure into the infosphere of cyberspace, we can find guideposts in the primordial ooze of consciousness.

A key aspect of archetypal learning environments can be found in a tale I first heard from Gregory Bateson:

> *One day someone sat at a computer keyboard and entered the following question: "Do you suppose that computers will someday think like humans?" After processing this request for some time, the computer displayed the following response: "That reminds me of a story... "*

Embedded in Bateson's tale is an important observation: One of the distinguishing features of humans is that we are storytellers. In fact, with the possible exception of certain marine mammals, we may be the only storytelling species in existence. This capacity of humans is so important that Jean Houston has referred to myth as the DNA of the human psyche.

The campfire...

For thousands of years, storytelling was a mechanism for teaching. While it was not the only mechanism, it was (and is) an important one. Through storytelling, the wisdom of elders was passed to the next generation. Good stories have always embodied a blend of the cognitive and affective domains — in fact, in story, there is no separation between the two. For example, one version of a creation story told among the indigenous peoples of the Northwest American Continent has Raven bringing light to the planet after it had been hidden away by Grandfather. He had hidden the light because he wanted to believe that his daughter was the most beautiful creature in the Universe, and could only hold that belief if he never saw her. Through trickery, Raven steals the light and, through mishap, creates the sun and the stars. This one story embodies not only the cosmological aspects of the people's belief, but also the metaphorical aspect of "being kept in the dark."

This quality of nuance and multiple interpretations is common to storytelling. It is one reason that adults and children can enjoy the same story together — each age takes from the story the elements that are appropriate. The power of storytelling is so great that even in more recent times (c. 250 BC,) we find Socrates responding to his students on occasion with the Greek equivalent of "That reminds me of a story."

There is a sacred quality to teaching as storytelling, and this activity took place in sacred places, typically around the fire. The focal point of the flame, the sounds of the night, all provide backdrop to the storyteller who shares wisdom with students who, in their turn, become storytellers to the next generation. In this manner, culture replicates itself through the DNA of myth. The often tangential nature of storytelling, its use of metaphor, its indirect attack on a topic, all combine to make storytelling an effective way to address topics that might be too confrontational to address head on. Story crafts its own helix around a topic. As Robert Frost said, "We sit in the circle and suppose, while the truth sits in the center and knows."

And so, from an archetypal perspective, the campfire represents an important aspect of the learning community. It does not stand alone, however.

The watering hole...

Just as campfires resonate deeply across space and time, watering holes have an equal status in the pantheon of learning places. Virtually every hominid on the planet has, a one time in its historical existence, needed to gather at a central source for water. During these trips to the watering hole, people shared information with their neighbors — those within their own village, as well as those from neighboring village, and travelers on their way to or from a distant village. The watering hole became a place where we learned from our peers — where we shared the news of the day. This informal setting for learning provided a different kind of learning community from that of the shaman or troubadour who regaled us from the podium of the campfire. The learning at the watering hole was less formal. It was peer teaching, a sharing of the rumors, news, gossip, dreams and discoveries that drive us forward. Each participant at the watering hole is both learner and teacher at the same time.

Just as water is necessary for survival, the informational aspect of the watering hole is essential for cultural survival. I'll have more to say about this later. For now, suffice is to say that the watering hole is alive and well in corporations where people gather around the water cooler (or, more recently, the copying machine) to continue a tradition of archetypal proportions. Executives and support personnel alike reenact on a daily basis scenes that have been played out on the plains of Africa for tens of thousands of years. Any disconnection from this informal learning community risks a disconnection from one of the things that makes us human.

The cave...

The learning community of the campfire brought us in contact with experts, and that of the watering hole brought us in contact with peers. There is one other primordial learning environment of great importance: the cave — where we came in contact with ourselves.

Through legends and artifacts we know that, throughout the planet, learners have needed, on occasion, to isolate themselves from others in order to gain special insights. Whether these periods of isolation took place in the forest, or in caves, whether they were the subject of great ritual, or just casual encounters with personal insight, the importance of having time alone with one's thoughts has been known for millennia.

The "vision quest" practiced by some indigenous peoples of the Americas represents one of the more formalized renditions of this practice. After a lengthy period of preparation, the learner is led to a cave with nothing but a blanket and is left for two days without food. During this time, through meditation, the learner may have a vision that can shape or guide him or her through the next phase of life. In addition to being a place of learning, the vision quest also becomes a rite of passage.

This rite of passage has another interpretation in modern parlance: the passage of knowledge from an externally accepted to an internally held belief. This internal "knowing" involves far more than memorization — it involves true insight. When Carl Jung was asked if he believed in God, he smiled and said, "I don't believe, I know."

We all have times in learning any subject when we need to internalize that knowledge. For Newton, it may have been under an apple tree. For Moses it was the wilderness. For us this internalization may take place during a walk in the woods, but is just as likely to take place during a quiet moment (or day, or week) in relative seclusion in a library (another sacred place), office, bedroom, kitchen or den.

Learners have long gathered around campfires, watering holes, and have isolated themselves in the seclusion of caves. They have experienced all these learning environments in balance and, if the balance is offset, learning suffered.

A modern example...

In my line of work, I spend a great amount of time attending professional conferences. These gatherings bring together experts who share their insights with large audiences over a period of two or three days. Over the course of the conference, one can see examples of all three learning metaphors in action.

For example, every December, there is a mathematics conference held at the Asilomar conference center near Monterey, California. A thousand or so schoolteachers gather for a weekend at the beautiful location on the Pacific coast to learn more about the teaching of mathematics. Numerous presenters share their insights through formal, scheduled, presentations. Exhibitors have their wares on display in a separate hall. Meals are held in a huge dining room, and lodging is on-site so people with common interests can share their ideas into the early hours of the morning.

A visitor to this conference would see, at any given time, examples of all three learning environments. Some attendees sit in conference rooms listening to experts sharing their insights. The glow of the campfire is replaced by that of the overhead projector, but the metaphor of the shaman or troubadour remains intact.

Outside these conference rooms, other participants gather at the exhibit hall, shuttle bus stops, main lodge, or other gathering places where they will be sharing ideas with each other. These interactions range from choosing an off-campus restaurant for a special dinner, to sharing new strategies for introducing calculus to children in middle school. In the absence of a clearly defined watering hole, gathering spots are chosen by convenience. As in the film, Field of Dreams, "if you build it, they will come." The exhibit hall, Asilomar lodge and dining hall are probably the closest this conference comes to providing metaphorical watering holes.

In addition to the two settings in which people are grouped together, the conference visitor would also see people walking by themselves along the trails through the dune: to the ocean shore. Individuals might sit for hours looking at the water, exploring the trees on the grounds, or just engaged in quiet thought. This "cave time" is facilitated by the nature of the Asilomar site. In fact, the ability of this one site to support all three of these learning environments probably accounts for its great popularity as a conference center, even if these multiple aspects of the facility are never overtly addressed.

It is interesting to note, by the way, that conference programs almost never mention anything other than the "campfire" aspects of the conference. Participants are invited to attend conferences to "hear the latest from experts in the field." While this has great merit, this aspect of a learning community represents only one third of the food for thought needed for a balanced meal for the mind.

In sharp contrast, I had the opportunity some time ago to see what happens when a conference is out of balance. A major invitational conference of educational technology in Washington, DC had brought an audience of about 600 highly regarded experts together for an intensive two days of presentations. The presentations were set up back-to-back, with no breaks until lunchtime, and then again after lunch with no breaks until dinnertime.

The presentations were (generally) excellent. For example, Arthur C. Clarke held us spellbound with his visions of the future during a live two-way remote videoconference from Sri Lanka. Even so, by lunchtime on the first day, there was a lot of grumbling from the attendees. They had been exposed to some intense campfires with no access to watering holes or caves. The conference was so tightly scheduled that several people complained of "overload." On the one hand, people were free to walk out of sessions they didn't like, but the presentations were of such high caliber (or the presenters were so well known) that most people were reluctant to walk out. Even so, by the second day, the audience had started to vote with its feet, building in breaks where none existed.

This experience brought home to me the importance of scheduling in opportunities for all three learning experiences, and showed the disaster that awaits those who neglect the need for balance.

While I've concentrated on the application of these archetypal learning models to conferences, they apply to classroom settings as well. Students have experienced the campfire of the traditional classroom setting and relied on the playground for their watering hole. Quiet time for reflection, when made available, takes place in libraries or study halls, or is deferred until the student goes home at the end of the day. The watering hole is being brought into classrooms today through the medium of cooperative learning but, tragically, school libraries (and the time to spend in them) are "at-risk" in schools where funding for such programs is in short supply.

Campfires in cyberspace...

Now that the national attention is directed toward the "informational interstates" kids of all ages are "jacking in" to the Internet, and our daily papers are filled with stories about mergers and joint ventures among high-tech information firms (e.g., the proposed acquisition of TCI by Bell

Atlantic), we have the opportunity to explore how these primordial metaphors for learning map into the telecosm. First, and make no mistake here, all three sacred learning spaces will have analogs in cyberspace. If they don't, then cyberspace will cease to exist as a domain of interaction among humans. Those using the new media will create their own analogs for these learning places, even if they are not designed into the system. In this regard, cyberspace is like any other frontier: rich in possibility, covered with brambles and weeds, but rich with fertile soil for development.

At first blush, it appears that the world of multimedia computing most closely resembles the domain of the campfire (at least as currently practiced). The market is replete with CD-ROM-based programs that turn the computer display screen into a colorful animated canvas on which ideas take shape and through which information is presented. The integration of text, sounds, color images and animated sequences provide many of the same tools for engagement known to the ancient storytellers, even if their images were conjured primarily through the mind's eye.

If it is the case that the glow of the campfire has been replaced by that of the computer monitor, we must ask if the stories being told around the modern fire are as compelling as those told around the old one. At this time, it is generous to say that the field is still sorting itself out. Many pieces of purportedly educational software created for the multimedia domain are mere transcriptions of material originally created for the medium of print. Multimedia is a new medium. Quality products will cease to exist until the authors and publishers understand this. When I look at a simple transcription into the new medium from the old, I feel that McLuhan died for our sins. It is time to atone for past transgressions and to realize that the world of interactive multimedia is completely different from anything we have worked with before.

For example, in the world of oral tradition and the printed page, stories have two aspects. They have a beginning, middle and end, and they have conflict and resolution in this Aristotelian world of storytelling, the conflict and resolution are the figure played against the ground of beginning, middle and end. We have certain expectation for such stories. They start with "Once upon a time and they end with some variation of "happily ever after." In the meantime, we are presented with a situation involving some conflict that, in general, gets resolved by the time the story ends. This model probably predates recorded history and is ubiquitous.

While new media can be used to tell stories in this fashion, the power of interactivity lets us move beyond the linear presentation of material. One possibility is to invert the Aristotelian world by creating a conflict to be resolved (the ground) and then to allow the user, through interaction with the multimedia software, to resolve the conflict through the creation of a unique story with its own beginning middle and end. This figure/ground reversal is possible because new media are not frozen in time. Unlike static words and images created by a storyteller, the learner can craft dynamic resolutions to a challenge created by a new breed of story maker.

The myth of interactivity…

It can be argued that virtually all multimedia products on the market today do provide some measure of interactivity. While this is true, the interactivity in some products is so limited that the flexibility I want for users is nonexistent. For example, many pieces of "interactive" storytelling software merely allow the user to choose the pace at which a linear story unfolds. True interactivity provides, at the minimum, the capacity to branch to different scenarios, to gather additional information, to take new twists and turns and, when very well done, to explore avenues never anticipated by the creator of the program.

Viewed in the context of the figure/ground reversal mentioned above, the weakness of many current multimedia titles can be seen. When users are just clicking buttons to progress through a

linear story told by another, multimedia becomes nothing more than high-tech page turning. On the other hand, when the user can craft a personal pathway through the content, even if the material is already in place, this freedom of true interactivity supports the creation of unique ways to resolve the conflict established at the start of the story. Interactivity of this type is rewarding at many levels. It facilitates creativity and the development of thinking skills by the participant in the journey through story space.

All of this is possible with the multimedia tools available today. The major limitation comes from the mindsets of those who craft products — otherwise well-intentioned people who, in many cases, are concerned with keeping development costs to a minimum and with getting products out the door in a hurry. The craft of multimedia design is not a linear mix of writing, image creation, sound composition, and selective placement of "button clicks" to advance to the next page. It is, instead, the storyteller's craft writ large — a new medium of expression whose ideas cannot be captured or presented in any other medium. We are experiencing the birth pains of this new craft, and it promises to be a noisy baby.

Watering holes in cyberspace...

If interactive multimedia represents at least one facet of campfires in cyberspace, then telecommunications represents a vast global watering hole. Anyone with a personal computer and modem can connect to a wide array of commercial and non-commercial services that provide access to electronic mail, real-time "chats" with other users, as well as other services I'll talk about later. These services are distributed throughout the world, and are connect to each other and to individual users through a complex web of networks, both public and private.

One of the richest and densest networks (a network of networks, actually) is the Internet, a Department of Defense informational infrastructure designed to serve as the communications backbone of the US in the event of nuclear disaster. This massive system has since been appropriated by researchers, educators and children as a vehicle through which they can connect to each other all over the world.

Almost all services allow users to send messages to each other (electronic mail) and facilitate real-time conferences with other users. This peer-to-peer dialog resembles the traditional watering hole activity with several special differences. First, rather than limiting discourse to people in a fixed geographic area, this watering hole is planetary in scope. Second, the current limitations of telecomputing restrict most interactions to text-based messages. This provides some measure of anonymity to the users of the system. A message in pure text form conveys no information about gender, age, disability, appearance — such an environment provides the opportunity to work with thoughts in themselves, devoid of other interpretations and biases that we might apply inadvertently if we engaged in face-to-face meetings.

This blessing is, unfortunately, also telecomputing's curse. When we have a peer-to-peer chat on any subject we wish, this interaction lacks the richness of face-to-face meetings. It is fine for topics of the intellect, but lousy for affairs of the heart. One cannot shake hands, smile, or hug through the medium of telecomputing — yet.

Caves in cyberspace...

Many of the same telecomputing services that provide electronic watering holes also provide vast resources of information that can be searched, extracted, added to, and commented upon by anyone with the interest to pursue it. Through the Internet, for example, anyone can log onto NASA computers to download the latest images from space, can access Library of Congress archives, university libraries, government agencies, and even some private corporations. The

Internet is so complex that navigating through it bears some similarities to listening to short-wave radio — there is some wonderful stuff out there, but it takes patience and diligence to find it.

On the private sector side, one finds services like Prodigy, Genie, Compuserve and America Online — subscription-based services that support a variety of communications and information sharing functions. Through America Online, for example, users can get caught up on the daily news from a wide variety of sources, or can connect to the White House Forum to download copies of speeches and policy statements almost as soon as they are released to the news media.

This information providing aspect of these services sets the stage for electronic caves - places where pursuers of knowledge can gather information in their quest for understanding or discovery. Working in isolation, threads of an idea can be pursued through the movement of fingers over a keyboard, rather than by running up and down library aisles extracting references from printed documents. Once the raw information is gathered and downloaded to the user's computer, he or she can then work in privacy to examine, interconnect and otherwise draw meaning from the results of the search.

While telecomputing services provide one form of electronic cave, libraries of information, images, sounds, movies, and programs — all stored on CD-ROM's — provide another. Each CD-ROM, a plastic disc the same size as that dominating the music industry today, can hold the equivalent of 275,000 pages of single-spaced text-information that in printed form would require the sacrifice of 23 trees just to provide the paper.

One of the greatest merits of the electronic cave, whether it is accessed through phone lines or through laser beams hitting a plastic disc, is that information of interest can be found with automated searching methods that free the user to concentrate on the underlying quest without being encumbered with the magnitude or dynamics of the searching process. This capability stands in stark contrast to information published in paper form. For example, short of reading an entire document to isolate a particular piece of information, most of us depend on the document's index to narrow our search. However, many documents lack an index, and those that do have one may not have entries for the topics of interest to us, or, if they do, may list those entries under key words other than those we might choose.

In the electronic world, once a document is loaded into a computer, the occurrence of any word can be pinpointed in a fraction of a second. This power of electronic searching allows us to keep our quest foremost in mind — it lets us explore conceptual space at the speed of thought.

H. B. Gelatt correctly states, "While information is food for thought, it isn't the whole meal." By simplifying the process by which information can be located, our computers simplify the harvest of background information from which we synthesize and extend our own discoveries in our quest for knowledge and wisdom.

Telecosmic nightmares — when nothing works...

The power of computer-based multimedia and telecommunications can be harnessed to provide modern analogs to our primordial tools of learning. Left to our own devices, many productive users of technology have gravitated to their own best mix of these applications. The challenge that faces us comes from institutionalized attempts to see technology as a replacement for one aspect of these modes of learning without thinking about the need for balance.

On several occasions I've had the opportunity to conduct courses for educators through "distance learning." I was located in a television studio, and students were located in cities all over the country where they could see and hear me through satellite transmission from my site. The return path from students was an 800-number they could call to respond to me by voice. Students could not talk with their peers at other locations (although they could, of course, talk with peers located

at the same site.) The studio in which I was located typically had two cameras — one fixed on me framing head and shoulders, and another located above a drawing pad on which I could place printed "overheads" or draw on paper with a pen. My movements and gestures were hampered, and spontaneity was made difficult because I couldn't see any of my audience. Furthermore, voice contact lacked spontaneity because of the time delay associated with shipping my signal through a geostationary satellite located some 24,000 miles above us.

Since my style is highly interactive, I found this environment to be quite stifling. On the other hand, I've encountered some educators who just love it. From their perspective, it doesn't matter if they see their students or not. They are content to be the talking head dispensing information to an invisible audience. As far as they are concerned, their role is not to engage in human discourse, it is simply to present information and hope it is received. This is a weak attempt to create a campfire whose embers are all but extinguished by the oppressive atmosphere of educator as the font of all wisdom. Watering holes and caves are nowhere to be found in this world.

While existing distance learning environments of the type I've described may be helpful to those for whom other options are not possible, I see them as high-tech replicas of a classroom model that dates back to the Church of the Middle Ages. One must remember that the function of the Church was to make us believe, not to make us think.

Telecosmic dreams…

In the world of slow telecommunications, the multimedia campfire was far removed from the telecommunity's watering hole. Now that perceived bandwidth is increasing by leaps and bounds, and the price of high-speed access to the Net is dropping, these two worlds are starting to merge.

One has to be careful when bringing water…

High-bandwidth is merging multimedia and telecommunications in highly portable devices that used to need connection to walls for 2 reasons, now one, soon none. High-bandwidth telecomputing with a mix of images, animations, sounds, text, etc. will be ubiquitous. As a result, campfire, watering hole and cave come together in a new synthesis — the modern day alchemist's retort — from which we can distill the essence of learning environments that truly meet the needs of all learners whenever and wherever they are.

About the Author

David Thornburg is an award-winning futurist, author and consultant whose clients range across public and private sectors in the United States and Brazil from startups to some of the world's most dynamic corporations.

He is founder and Director of Global Operations for the Thornburg Center and Senior Fellow of the Congressional Institute for the Future. He conducts research and provides staff development in educational futures, multimedia, communications, and whole mind education. He helps clients to explore ways that telecommunications and multimedia will change learning at home and in the classroom.

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Editor's Note: Asynchronous learning adds flexibility to the hours, days, and geographic locations where learning takes place. This raises questions regarding technology, when peak loads occur, time-of-week to post online classes, and hours when students need academic and technical support. This study clarifies a host of issues by analyzing student behavior based on the total enrollment of a large distance learning—blended learning program for a period of four years. It sometimes confirms and sometimes changes our frame of reference. For example, scheduling should accommodate student's lives and family activities, which in turn are shaped by the work week and seasonal holidays. As a result:

> "*We may need to undergo a mental attitude shift: rather than talking about 'students who work,' it may well be more appropriate to talk about 'workers who study'—where it is irrelevant whether this is paid or unpaid work. In essence most of these students are comparatively resource rich but time poor*."

This study is especially valuable for instructors and administrators for designing and scheduling online programs and support.

Patterns of User Behavior in University Online Forums

Leslie Burr and Dirk HR Spennemann

Abstract

Online forums have become the backbone of most computer-supported distance education programs. While analyses have been carried out assessing the content of a limited number of such forums, there is little work done on how and when students make use of such facilities. There is much talk about 24/7, anytime, anywhere availability—but do students make use of this extended envelope, or is this just education rhetoric? This paper presents the outcomes of a large-scale study examining the usage of over 2000 forums for a period of four years.

Keywords

computer-mediated communication, asynchronous discussions, bulletin board discussions, higher education, student study habits, time use analysis, forums.

Introduction

Studies have shown a phenomenal growth of the internet usage in Australia, with the number of households connected to the internet increasing from 6% in 1996 to 53% in 2003 (ABS 2004; Lloyd & Bill 2004). A recent study based on the 2001 census found that 75% of all users connect to the internet from home; 34% from work and 18% from elsewhere. Of the population surveyed, 25% used more than one access location (Lloyd & Bill 2004). As both an innovator and an early adopter, the Australian education sector has been a major driver in this regard. Internet technology now pervades all aspects of academia, from research and administration to computer-enabled learning. Online discussion forums (threaded discussion boards, bulletin boards) are a major element in developing asynchronous and threaded environments in which students can participate in tutorial discussions regardless of physical locations and time zones.

Some research has been carried out on forums, mainly on the discussion of content, commonly based on a select number of forums (cf. Theodore & Nelson 2004) but also their suitability for specific learning needs, such as field situations (Knowlton 2004), an assessment of usage difference by gender and age (Burr & Smith 2003); matters of rurality as limiters of access (Burr & Smith 2003)

Elsewhere, Burr & Dawson (2003) have addressed the learner-teacher interaction in forums, redefining the passive to active process as an evolutionary process which matures over time and with experience of the environment. The evolution moves from system interaction, through content interaction to the higher levels of learner interaction. Burr developed a methodology for assessing whether a forum is a mere question-and-answer tool or whether advanced learning does take place (Burr 2004).

Some studies looked at student satisfaction and level of engagement with online forums (Virk 2004), but are usually based on selected forums and small samples.

An understanding of student utilization and usage behavior is critical to any such discussion but has rarely been analyzed. There is much rhetoric that digital, online environments allow students to study irrespective of the tyrannies of distance and time (Creed 1998), that learning can, and in fact, does occur 24/7, and that tertiary education providers have to make allowances for this. Does this reflect wishful thinking by pedagogues and university administrators, or is it reality? Online study environments have been around for some time so that arguments of a time-lag for adjustment and familiarization are less and less persuasive.

Users of an online environment do so largely on a non-compulsory basis, so it is important to analyze those who come to the environment despite the predictable hurdles of connection and access. This study, drawing on the very large scale environment of online forums at Charles Sturt University and the large user population of the environment will examine the student behavior in three dimensions: over the duration of a study term; as a factor of the day of the week, and as a factor of the time of day. It will do so by analyzing all forum posts and views for all subjects offered by Charles Sturt University between 2000 and 2003. The large user population allows this study to take Buxton's direction into the "human centric" domain which reflects the importance of usage and activity rather than technology (Buxton 2001).

Rationale

The patterns of user behavior are important to analyze both for technical and for pedagogical reasons. On the technical level, they are an indicator of load determinants for network and server traffic predictions. On the pedagogical level, it is important to understand user behavior in order to ensure that the pedagogy is suitable for users. Thirdly, an understanding of the patterns of use allows for the planning and timely delivery of resources and services.

Load Determinants

Any newly introduced system will see an increased take up of usage by the student population as both the technology improves and as participants appreciate the usefulness of the features offered. Therefore, online learning systems within enterprise environments must be able to scale to very large levels of use. Predicting levels of use is important in order to ensure that the physical information technology infrastructure has the capacity to deliver reasonable access times, which in turn influences user satisfaction and, ultimately, acceptance of the system. In the ideal world the system is available 24/7 with both a high functional availability and unobtrusive, seamless functionality—it is just ‘there.’

Understanding usage patterns allows maintenance times to be more easily slated with system outages/unavailability affecting as few users as possible. In some circumstances, however, it is impossible to cope with very large peak loads. The release of exam results is a classic example.

If techniques can be found for flattening the peaks of user load, it is possible to amortize infrastructure in order to reduce costs. This modeling can only be achieved by reaching an

understanding of patterns of user behavior. As can be seen by Figure 1, large peaks occur at the start of each session, particularly the (southern) autumn session (February to June).

In physical infrastructure terms a machine has to be sized to be able to cope with the peak, in order that users do not suffer a negative experience. This is particularly important for new users experiencing the environment for the first time. It is critical to ensure that the initial experience is a positive one. At the rate of growth of the forums, it is unlikely that a machine can be sized for that peak growth and then be extensively under-utilized for the greater proportion of the semester. Thus practical ways have to found for phasing the introduction of forums and thus spreading the peak demand.

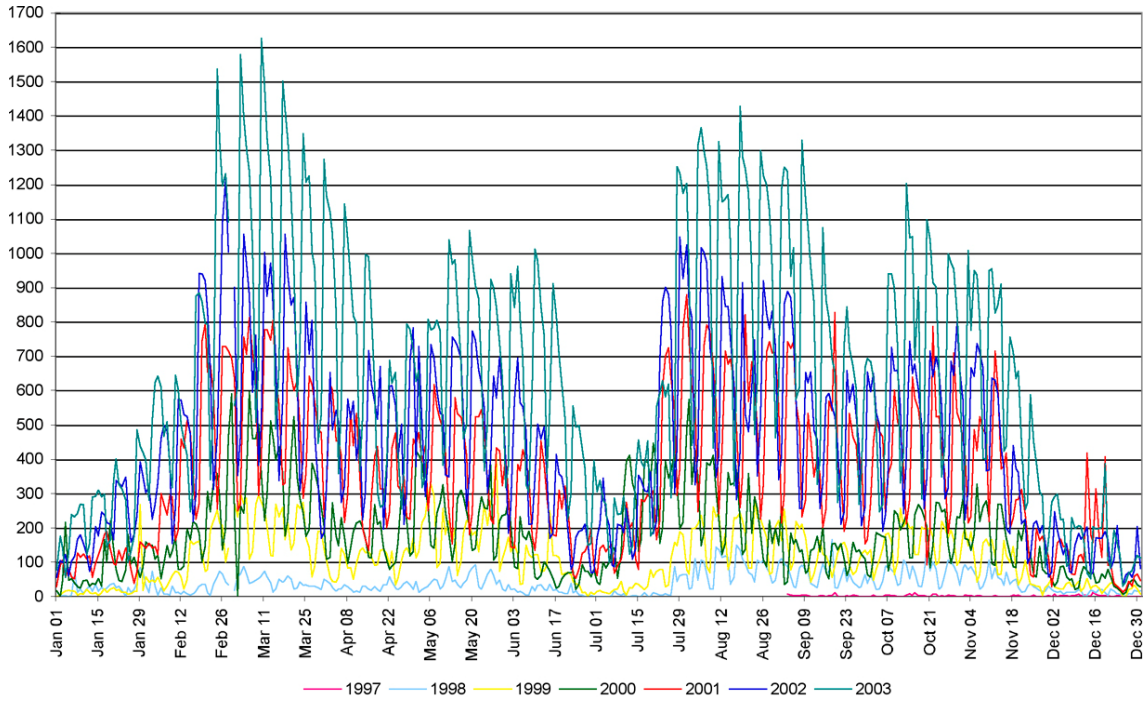

Figure 1. Annual Pattern of Daily Forum Posts (daily absolute numbers) at Charles Sturt University.

Pedagogical Issues

Understanding patterns of user behavior can influence planning and scheduling of assessment dates, as well as pre-reading and pre-tests to be slated during session breaks. In order to respond to posts in a timely manner, it is important to understand the pattern of online attendance by students. This will then allow for not only a more orderly approach to work planning, so that the lecturer can timetable work sessions throughout the week (anecdotal evidence suggests that lecturers can be overwhelmed by the feeling that they must monitor all their forums throughout the day - and night in some extreme cases!), but that a pedagogical, student-centered approach could be determined. This would allow a lecturer to plan posts on a regular basis, but at a time which is best for the learning outcome.

It may tempting to suggest that the time of posting by a lecturer may influence the pattern of behavior of the user, however later discussion will refute that argument of cause and effect.

Resource Paradigms

Patterns of use allows for the planning and timely delivery of resources and services to students. Although current delivery of services is very much tied to “normal” office hours (*i.e.* 9 am – 5

pm, Monday – Friday), a new paradigm of flexible hours which is determined more by the requirements of online learners than the availability of staff must surely develop.

The extent to which a forum moderator is required to be online on a Saturday evening for example, can only be predicted my monitoring and understanding user behavior. Although it is unlikely that staff work patterns will need to totally reflect user behavior, other models of resource provision can be considered.

For example, user behavior may determine that a discipline "generalist" be available online to cover every subject area until (say) midnight. This could be arranged on either a daily, weekly, monthly or session basis. The availability of staff is not limited to academic staff. For example, staff should be available from student services. Some staff may well wish to have this flexibility of work hours and is entirely consistent with the "work from home" established practice of academic staff.

By a detailed understanding of user behavior, a new and efficient model of generalist support can be planned well in advance. In gross terms it can be seen that previously expected high levels of support for weekend and term break periods are in fact not required. Large numbers of users do not appear to take advantage of time away from work (*i.e.* Easter, Christmas holidays) in order to engage in study. Overwhelmingly, users appear to align study patterns with what is considered "normal" work patterns.

The institution

Established in 1989, Charles Sturt University is a multi-campus institution in New South Wales, Australia. It maintains campuses in Albury-Thurgoona, Bathurst, Dubbo, Goulburn and Wagga Wagga, with study centers in additional localities. In 2003, the majority of a total enrolment of 38,365 students studied via distance education (80.2%) with another 10.7% studying as 'blended learners' (i.e. some subjects studied by distance education). The gender balance is slightly skewed towards women, with more among on-campus students (56.8%) than distance education students (53.5%). On average, on campus students are approximately seven years younger than distance education students (25.5 vs. 32.1 years), with little difference between the genders.

Charles Sturt University provides online support for approximately 2,000 different subjects, both internal and distance education, throughout each year. At the time that an online subject becomes available to students, an online forum is automatically generated and linked to the subject. Each forum is populated automatically via the C.S.U. student administration system with each of the students enrolled in that subject. The manager of the forum is electronically assigned via a database list of subject coordinators. Subject coordinators are able to manually create sub forums based on manually selected sub populations of the class list. The subject coordinator is provided with this capability as part of the suite of functions available through the management tool.

The data

Each member of a forum at C.S.U. must authenticate themselves into the forum. Each time a new message is posted or an existing message viewed, these actions are recorded within a database. Thus it is possible to analyze a very large scale online environment using semi-automated techniques. The initial analysis of interaction undertaken within this study concentrated on participation rates as measured by the number of posts and their relationship to views.

The data have been collected for the period 2000 to 2003, covering eight sessions, with data relating to the usage of the forum by time of day limited to 2000–2002. The key academic dates for the period are set out in table 1.

Table 1.
Key academic dates for the period covered in this study (2000–2003)

		On-campus classes		Residential schools		On-campus classes		Examinations	
Year	Session	Begin	End	Begin	End	Begin	End	Begin	End
2000	Autumn	21 Feb	31 Mar	1 Apr	20 Apr	26 Apr	2 Jun	5 Jun	16 Jun
	Spring *	10 Jul	25 Aug	26 Aug	15 Oct	16 Oct	17 Nov	20 Nov	1 Dec
2001	Autumn	19 Feb	31 Mar	17 Apr	5 May	7 May	8 Jun	12 Jun	22 Jun
	Spring *	23 Jul	7 Sep	9 Sep	29 Sep	2 Oct	9 Nov	12 Nov	23 Nov
2002	Autumn	18 Feb	29 Mar	2 Apr	20 Apr	22 Apr	7 Jun	11 Jun	21 Jun
	Spring *	22 Jul	6 Sep	8 Sep	28 Sep	30 Sep	8 Nov	11 Nov	22 Nov
2003	Autumn	24 Feb	18 Apr	22 Apr	10 May	12 May	13 Jun	16 Jun	27 Jun
	Spring *	28 Jul	12 Sep	14 Sep	4 Oct	6 Oct	14 Nov	17 Nov	28 Nov

*) The Residential school period appears prolonged because of the Olympic Class-free period (4 Sep to 2 Oct).

Since its adoption as a fully functional system in 1998, the online forums have seen a substantial uptake in use (Figure 2).

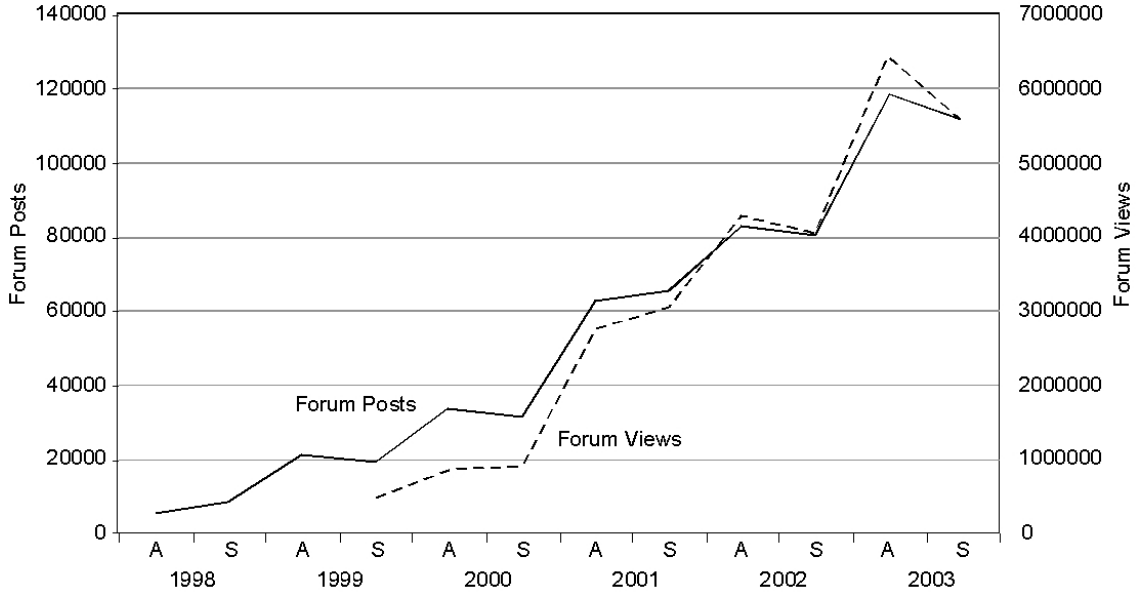

Figure 2. Total Volume of Forum posts (6mo periods)

Annual Pattern of User Behavior

Clearly the patterns of use over a twelve month period show a nexus between the two study semesters and high demand. The University also operates trimesters in parallel with the two main sessions. Although some forums are based on trimesters, and could potentially impact the sessional use profile, the trimester forums are low in number and insignificant in size and activity. Forums based on trimester subjects can therefore be discounted as influencing the present analysis of the annual behavior patterns.

There is a close correlation between the traditional holiday and University breaks and reduced levels of use (Figure 3; Figure 4). Christmas holidays, Easter and mid term breaks are clear examples. These patterns are surprising given that students study predominantly within the distance education mode. One may expect them to undertake most of their study during periods of spare time availability. This does not appear to be the case during the holiday periods. Minimums of use occur during holiday periods.

The pattern is exacerbated by the University calendar, which tends to follow traditional holiday periods. Although not entirely unique to online learning, but related to distance education by what ever delivery mechanism, the breaking of the nexus between the session calendar and the holiday calendar, may provide students with a greater opportunity to devote more time to their study.

However assumptions about cause and effect, particularly as they relate to the ordinariness of everyday life, need to be approached with caution. Because students are on "holiday" does not necessarily mean that they have any more available time for study. For example, women represent 60% of online forum users. During "holiday" periods, and with the possibility of children at home all day (rather than at school from 9am to 3pm), it may well be that women in fact have less disposable time available for study. Although the allocation of study time for distance mode students is outside the scope of this study, this parameter is now less masked by other influences, such as the online environment *per se*. We may need to undergo a mental attitude shift: rather than talking about 'students who work,' it may well be much appropriate to talk about 'workers who study'—where it is irrelevant whether this is paid or unpaid work. In essence most of these students are comparatively resource rich but time poor.

Figure 3 shows the annual pattern of posts to all forums at Charles Sturt University from 1999 to 2003. The curves are very similar to each other, with 1999 showing two major peaks per semester, while the curves for 2000-2003 exhibit only one peak (see below). It is possible that the 1999 dual peak was influenced by the novelty value of the system. The pattern of views is similar but more balanced (Figure 4).

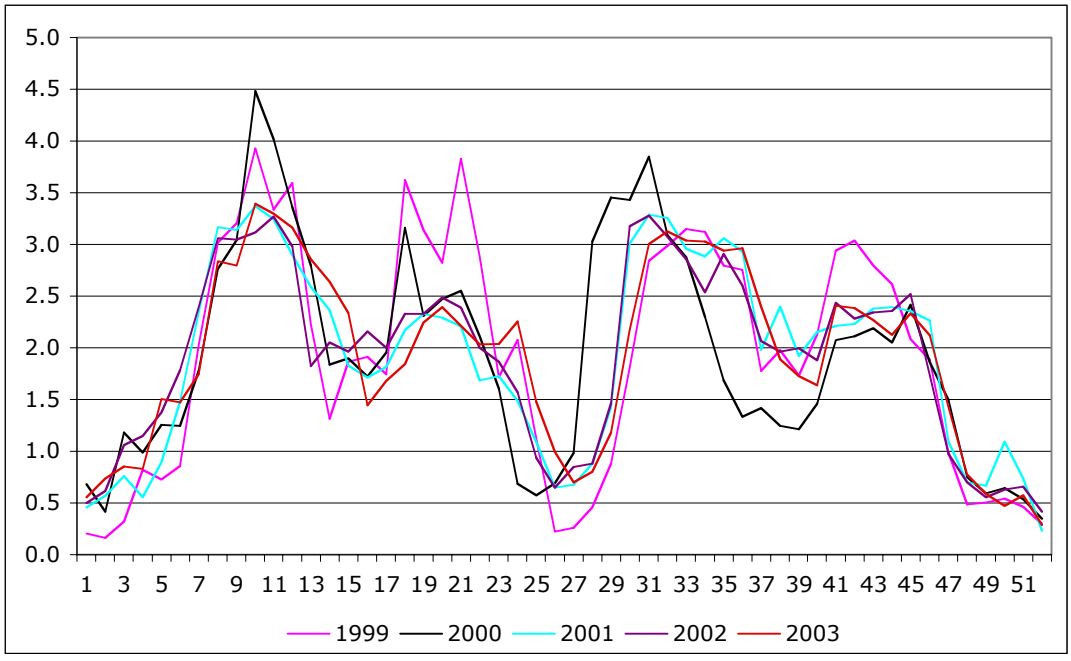

Figure 3. Annual Pattern of Daily Forum Posts
(in weekly intervals, expressed in % of all posts for the year)

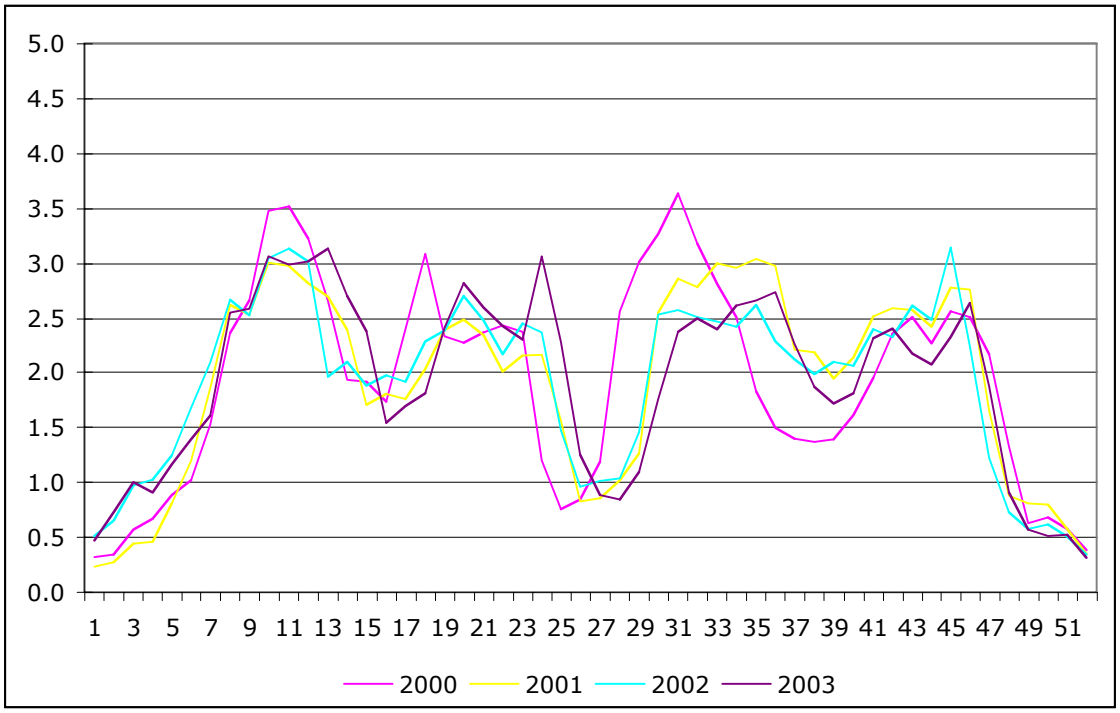

Figure 4. Annual Pattern of Daily Forum Views
(in weekly intervals, expressed in % of all posts for the year)

The curve for the (southern) spring term of 2000 differs from the others, largely because the Australian government directed universities to adjust their teaching calendars in such a fashion that the period of the Sydney Olympics (from 4 September to 2 October 2000) would be teaching free. This reduced the mid-year break and extended the mid-term break in spring. The forum usage, both posts (Figure 3) and views (Figure 4) is low throughout the Olympic period underscoring the observation that actual forum usage reflects the sessional study pattern with holidays as periods of low activity. Moreover, during the Olympic period forum utilization was even lower than during the spring mid-term break in other years.

Sessional Pattern of User Behavior

An analysis of the sessions provides interesting insights into student behavior over the duration of a thirteen-week study semester. This analysis is based on the average posts and views for the period 2000 to 2003 (posts: n=589,359; views n=28,025,746). The years 1998 and 1999 are excluded from the averages as can be argued that these were the 'start-up' years of the forums, where both staff and existing students familiarized themselves with the technology and its opportunities. Beginning with year 2000 intake students and staff were using the forums as a mainstream activity. Figure 5 shows the average sessional usage of the forums for the period 2000 to 2003, with the spring 2000 term adjusted for the Olympics shift. The average ratio of views over posts was 47.6 : 1.

Patterns of use show a peak of activity at the beginning of a major session with the autumn session (and start of the academic year) peaking higher than the spring session. Clearly there is a user expectation and willingness to participate right from the beginning of the session—the participation does not have to "built," it is ready and available. However, the fact that forum

activity during spring is less than during autumn may indicate that some users became 'jaded' and decide that participation is not amenable or advantageous for them.

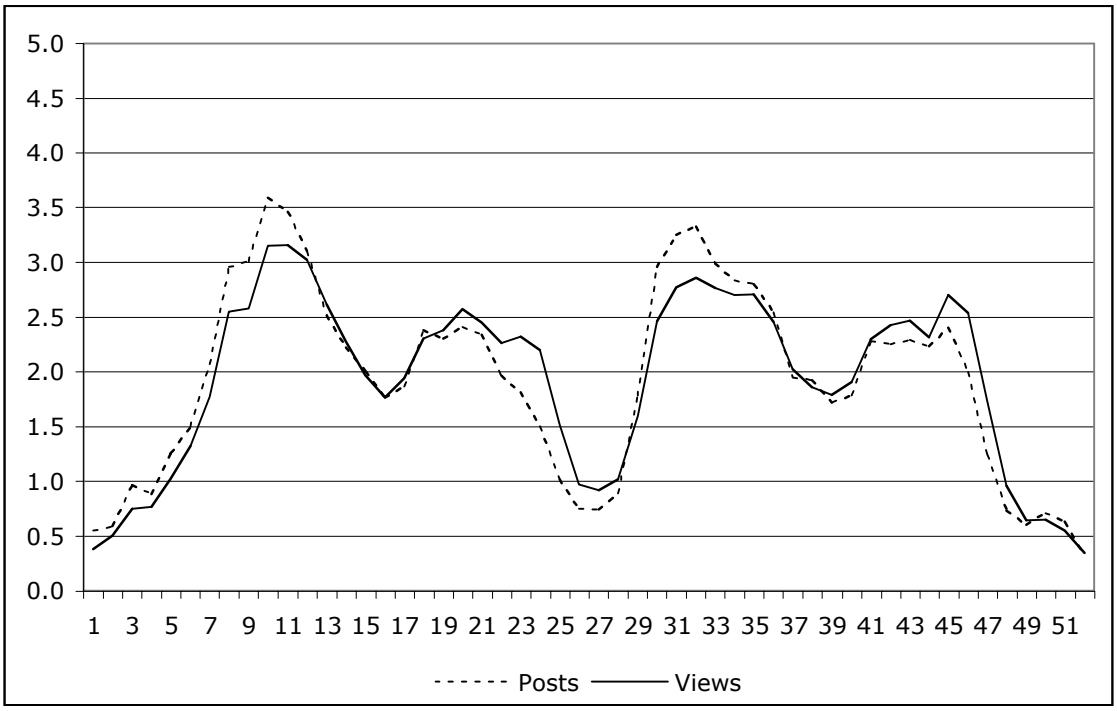

Figure 5. Average use of CSU online forums 2000–2003 (in weekly intervals, expressed in % of all posts for the year

The pattern of use for a given term, be it autumn or spring, are overall the same: a much greater usage before than after the mid semester break. This is particularly the case with forum posts, which also outpace views (in percentage terms) (Figure 5).

The maximum posts occur during weeks 2 and 3 of each term. Posts then fall off during the mid semester break and rise again after the break, but only to approximately 60% of the original traffic. Although this may be explained by a reticence by the user to rejoin a community after a break, it could also be explained as a natural decline in posts (and views) as the session progresses. The curves run in sync during the period before the mid semester break, with posts far outpacing views (in annual percentage terms). While immediately after the mid semester break both posting and viewing activity recommence apace, posts soon drop off altogether, while views continue to the end of term. During the spring term they in fact slightly peak during the pre-exam week.

It would appear that new generation of information or active queries for information declines at that point, while rereading of existing posts becomes the prevalent occupation, most likely linked to end-of semester exam preparation.

Patterns of Use throughout the Week

Over the period of a week, the posting of messages is below (theoretical) average on Mondays and Tuesdays, but rises sharply to a peak on Wednesdays, remains above average Thursdays and Fridays, trailing off on Saturdays and Sundays (Figure 6). The viewing pattern, however is different. Students view forums exceed the average from Monday to Thursday, with a peak on Tuesdays (the busiest day for forum traffic).

Anecdotal evidence has suggested that the main study time for distance education was on Saturdays and Sundays—that assumption has largely gone uncontested. Clearly according to use of the forums, this is not the case for forums use. Both in terms of viewing and posting, weekends are by far the least utilized days.

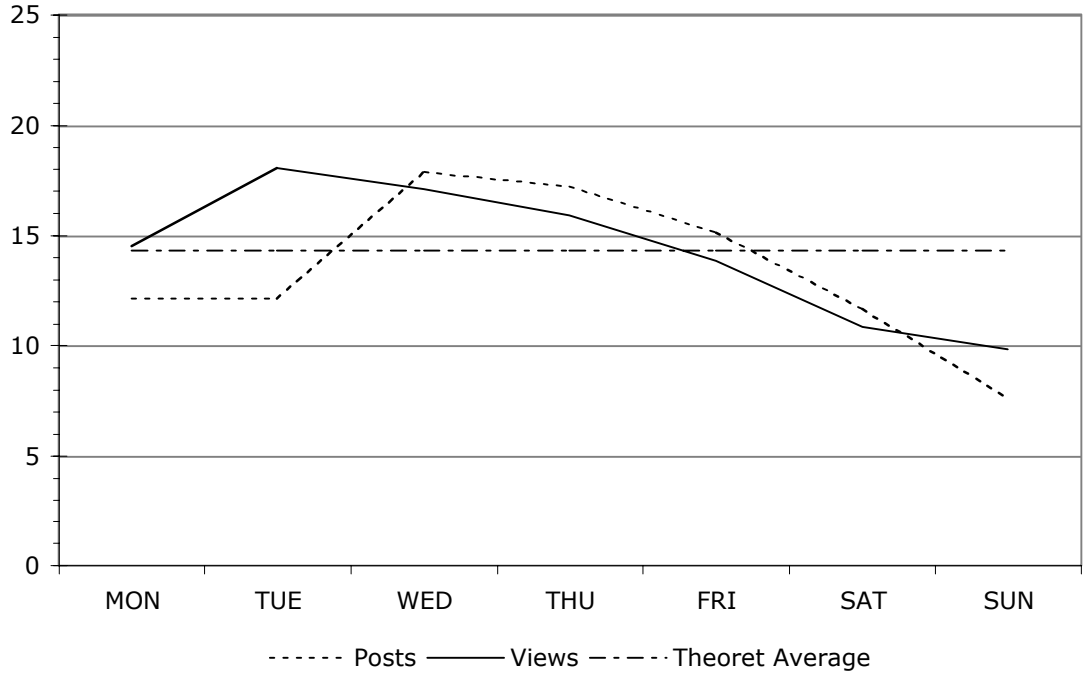

Figure 6. Patterns of Forums Use by Day of the week (average 2000 to 2003)

Because so many students are part-time and are in the work force, it may well be that students access the forums from work where they may have faster Internet access and also access to better, or cheaper, printing facilities. It is possible that relevant forum messages are accessed and printed at work and then used for study at home on the weekends. It is also possible that students prefer to use the weekends for the study of their printed materials and textbooks. The fact that forum views peak on Tuesdays, but that forum posts peak the day after seems to lend support to the assumption that people view and print forum posts of interest at the beginning of a work week and rejoin the discussion the day after.

The low utilization of the weekend can have various causes, ranging from competing family and personal commitments to competition for computer and internet access by other family members, in particular school-age children.

Although the demonstrated daily pattern has been established for forums over a period of three years (Figure 6), the question arises as to whether this pattern exists in isolation to other online university services provided to users and whether there is a correlation with services provided to a completely different set of online users. To assess this daily pattern of forum use was compared with the daily pattern of a different university services targeted at the same user group, i.e. the student portal (my.csu.edu.au) and the digital university-student communications and notification system (e-box)(Figure 7).

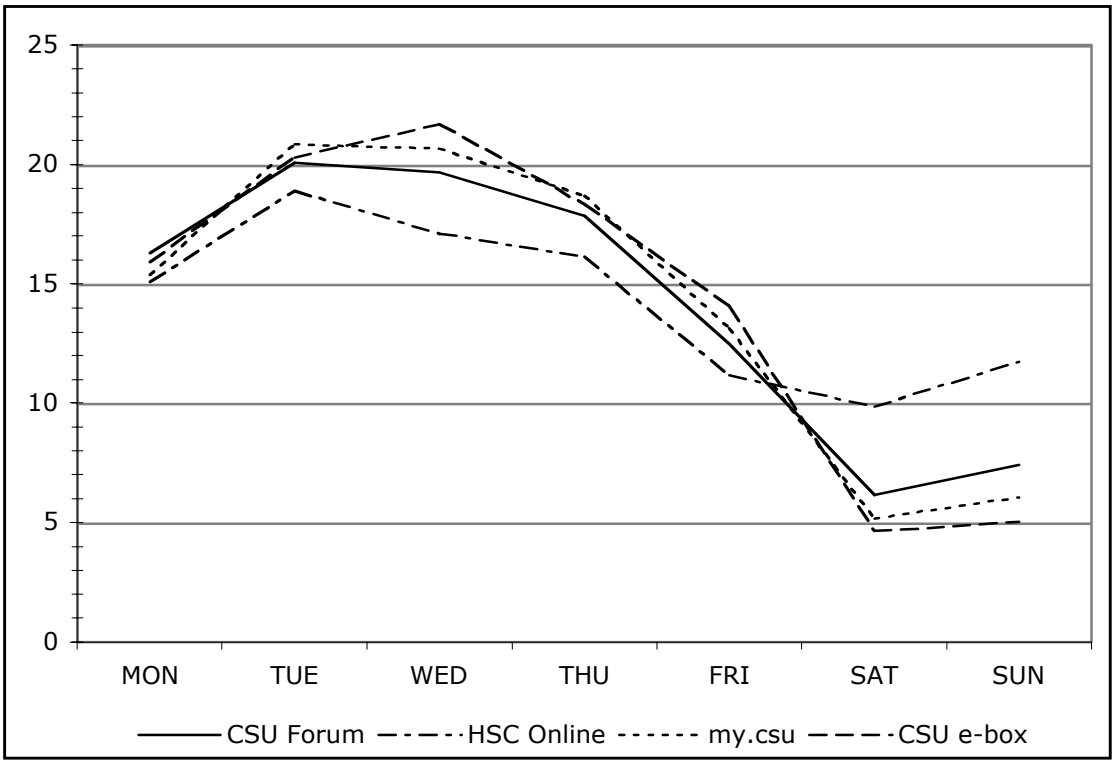

Figure 7. Weekly Patterns of use of various CSU Student services October 2002. CSU Forum views (n=5,144,174); HSC Online (n = 7,881,215); e-box (n=2,739,059); my.csu (n = 10,283,125)

It was found that the same weekly pattern emerged (Figure 7). This is not surprising since there is a high correlation between use of the forums and the portal, and although the portal is not the only method of accessing the forums, it is the most popular.

Comparison with other learners

In order to establish if the pattern is representative of Australian online learner behavior in general rather than just C.S.U. learners, a public site, NSW HSC Online (hsc.csu.edu.au) was analyzed (Figure 7). This site caters for a specific audience of New South Wales Year 12 students and is used heavily by students both in and out of formal secondary school classes (Green 1996; Gorman 2003). Even though NSW HSC Online caters for an entirely different group of learners (in this case senior secondary school students in the age range 16 – 20), the pattern of use is very similar to the C.S.U. environment. An increase in use over the weekend can be noted however.

An examination of public web servers should reveal whether user patterns change once groups of users other than learners are included in the audience. So as to keep the variables to a minimum, the proxy server (proxy.csu.edu.au) and the public web server at C.S.U. (www.csu.edu.au) were chosen (Figure 8).

CSU directs all its outgoing requests for web pages through a proxy server and copies of the files are temporarily cached to improve performance and to reduce traffic (Spennemann in prep). The CSU proxy shows a completely different level of demand, peaking towards the end of the week.

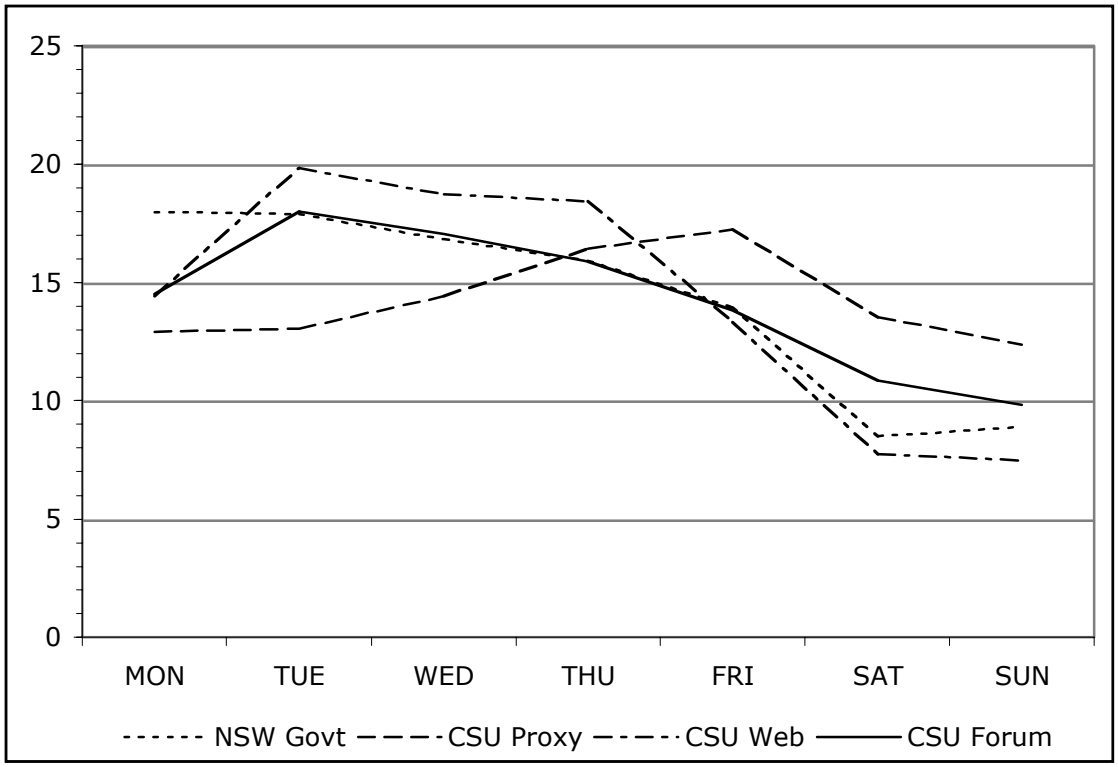

Figure 8. Daily Patterns of Server Use October 2002 (CSU Public Server n=19,266,584; CSU Proxy server n=129,134,228 (Oct 2003); NSW Government server n=18,262,769)

The public web server has a marketing focus and provides information to prospective students as well as providing general information. As such, the daily pattern still reflects the drop off on the weekends, however the weekday traffic appears to be stabilizing particularly over the Monday – Thursday range indicating that the pattern of behavior does begin to change as a different group is introduced into the audience.

The services provided within each of the previously discussed examples are quite different. However it is interesting to note that the user behavior within the C.S.U. environment (*i.e.* forums, my.csu and to some extent the public server) tends to be similar. However once the services are examined outside of C.S.U. learners, patterns of behavior begin to change.

It would appear that the patterns of daily use are similar for learners whether they are visiting forums, the portal, HSC Online and to a lesser extent the CSU public web server. Note that they are not the same group of learners (in fact they are even across two different educational sectors) but learners just the same. This is a quite unexpected outcome and demonstrates that user behavior is entirely driving the pattern and that the service or the timing of manager postings for example, are unlikely to influence the patterns of behavior.

Comparison with on-campus students

How does the C.S.U. forum use compare to on-campus presence? Even though pure on-campus students represent only 9.2% of the student population, with another 10.7% studying as blended learners, i.e. only some subjects in distance mode, they may skew the picture. The forum statistics obviously do not distinguish between the two—indeed, the advantage of the forums is to be able negate many of the requirements of on-campus presence.

Figure 9 plots the on-campus presence of students on all the main three C.S.U. campuses in 2003 (Albury-Thurgoona; Bathurst; Wagga Wagga) as constructed from the timetables and actual enrolment numbers (Spennemann 2004). Also plotted is the usage of on-campus computer laboratories, many of which have 24/7 access (Spennemann *et al.* in prep). Attendance fluctuates during the week with, understandably, no classes scheduled for the weekend. The usage of the computer laboratories is more level through the working week, with a few students using the labs during the weekend. Compared to these, the forum use is much more level throughout the week and exhibits a much higher usage during the weekend.

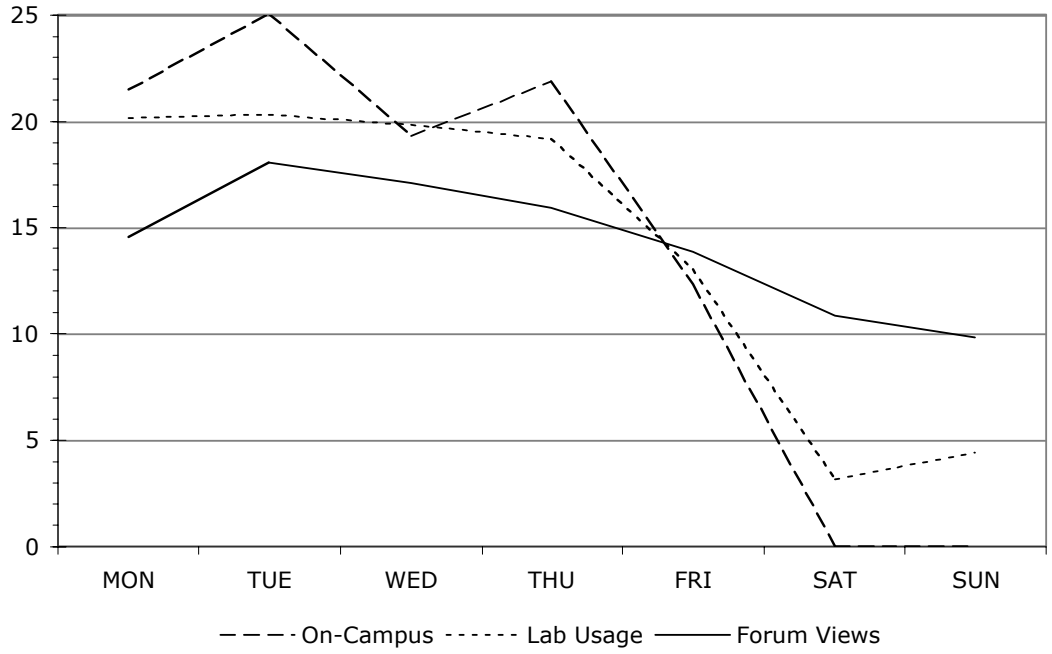

Figure 9. Comparison of the weekly pattern of Forum views with that of on-campus presence of students and computer laboratory usage (in % of the week)

Implications

It would appear that forum usage is determined by external factors, such as work week, access to machines and the like, rather than by the academic pattern. Thus it is imperative that the teaching and learning environment plans its activities around the actual usage pattern rather than trying to influence that pattern.

Clearly the reading pattern for learners has moderate use on Mondays, and a high use on Tuesdays, gradually tapering off to Sundays, with a slight increase on Sundays. The greatest 'reaction' to views occurs on Wednesdays, when posts are at their peak. Thus if the maximum exposure to new material or postings is to be garnished, then that material needs to be published later in the week (*i.e.* Friday to Sunday) in order to receive maximum exposure on Mondays. Patterns of work behavior by subject coordinators or forum managers for example will need to be adjusted only to the extent that new material needs to be posted during that time. If participation in the forum itself needs to be demonstrated (as part of an assessable item, for example), then this should be scheduled for the middle and later part of the week. It is highly unlikely that learning and teaching outcomes will be substantially increased by participation within the forums on weekends.

Patterns of Use throughout the Day

But if forums are heavily used during weekdays, does that mean that this usage occurs during the work hours (and thus probably from the place of work) or after hours, and thus from home? To assess this, the average usage of forums over the duration of a day, with the figures expressed in percent or the total views per day were calculated.

Online forums were used most heavily in the time band 8 am to 11 pm peaking at 1pm. Another smaller but significant peak occurs in the 8pm to 9 pm time band. Again it is surprising for a distance education focused enterprise that online forums were accessed so heavily in the 9am to 5 pm band. One again, this pattern is more interesting in that it more closely reflects traditional hours of access than it does non traditional patterns – the peak at 1pm most likely caused by lunch time access at the workplace or the CSU computer laboratories – again highlighting that "spare" time is a determining factor.

The time band 7am – 9am shows a remarkably steep increase in traffic indicating that a number of students access forums early in the mornings, possibly within the workplace. Certainly on campus traffic would have a minimal impact on traffic at this time.

The pattern of forum access, established over the past three years (Figure 10) is very high during the working day, peaking at 1pm, which is not consistent with previous surveys relating to conventional distance education study habits. As a result of Charles Sturt University's high distance education intake, students may be accessing the forums from work during these times, which is supported by the peak occurring during work lunch times. High use also occurs at 8.00 pm, which is more consistent with previous study patterns for distance education students.

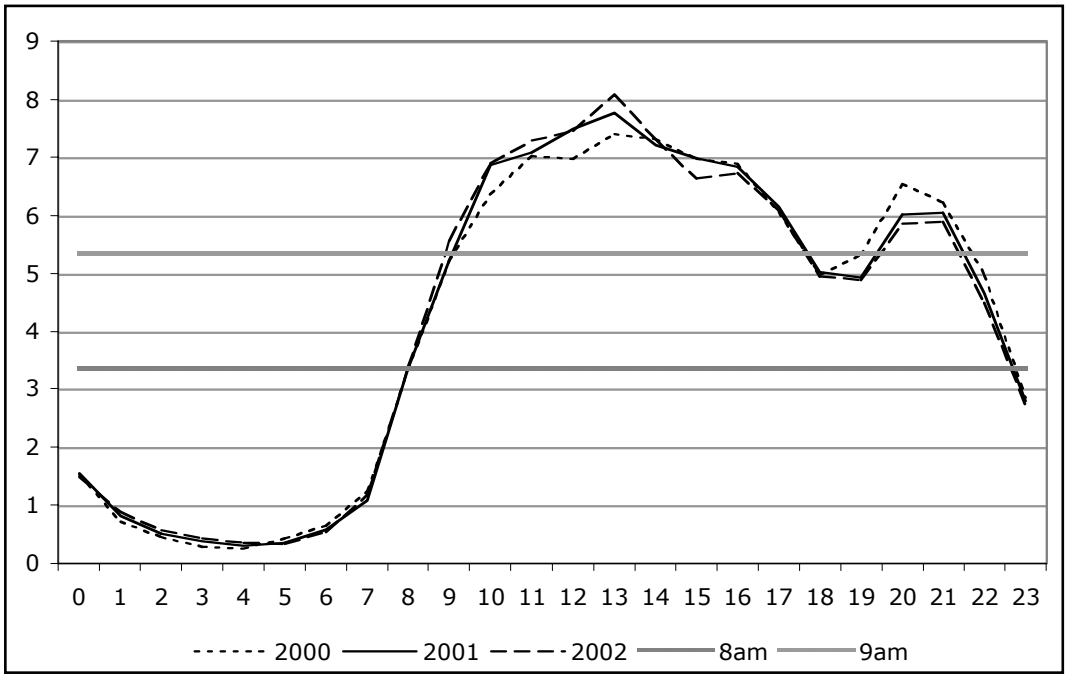

Figure 10. Hourly Patterns of Use – Forums. The horizontal line indicates the 8am (lower line) and 9am averages (upper line)

The traffic between 12 midnight and 1 am is worth noting. Presumably this traffic mostly originates from the overseas student cohort. These will be "real" visitations since forums operate under an authenticated environment, the traffic is unlikely to be automated system tools and

search engines (known as "noise"), common in public web environments. The distribution curve shows a steep rise between 7 and 9 am, a well-developed usage during the work day and a drop during the end of work-day and dinner period. Usage rises again after 7 pm with a high presence between 8 and 9 pm.

The rate of increase of traffic in the mornings is far greater than the decrease in the evenings which tends to have a lengthy "tail". Surprisingly in order to support the same level of learner activity that occurs at 9 am (which is taken very much for granted in most institutions), the online environment would be required to be resourced until 11 pm. To support the same level of activity as occurs at 8 am (which is becoming the trend in many institutions), a service envelope stretching until 12 midnight would be required. The support required in the mornings is generally provided without question, however the notion of providing that same level of support until 11 pm or 12 midnight would be considered by many to be unjustifiable.

Comparison with other learners

Again the question arises as to whether this is a pattern in isolation of other online services and in isolation of other groups of users. The main on-line services for students, forums, my.csu and e-box, show similar patterns, with my.csu usage being higher in the mornings, at the start of the day, and e-box usage higher at the end of the working day during the census months of October 2002 (Figure 11). The "after-dinner peak' is present in all three. These curves are in contrast to that of the HSC Online service frequented by year 12 students. High school student usage starts later than university student usage. This offset is a function of the different circadian rhythms among teenagers (cf. Caskadon *et al.* 1998, DeWeerd *et al.* 2003). Furthermore, the HSC curve shows a peak during the main school hours, indication school-based access, a peak after returning home from school (between 16:00 and 17:00) and a peak after dinner, between 21:00 and 22:00. The main difference between is the prolonged high use among HSC Online usage during the evening. If we were to take online usage as a proxy measure for learning diligence, the high school students are much more dedicated learners.

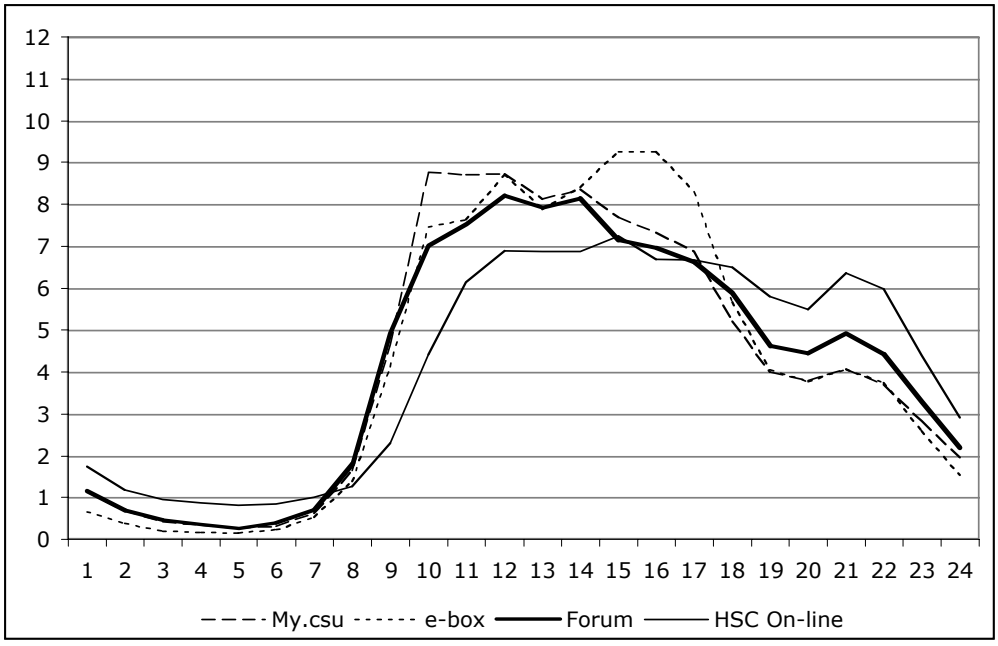

Figure 11. Hourly Patterns of Use of various Student services October 2002.

How does this compare to the general Australian population? Spennemann (in press) developed a web usage curve based on data from five ISP-specific telephone exchanges along the eastern

seaboard of Australia (early 2004; Brisbane, Sydney x 2, Melbourne x 2)('Eastern Australia.' Figure 12). Elsewhere Spennemann (in prep) assessed the average usage of government web pages along the eastern seaboard (State Government Websites of Queensland, New South Wales and Victoria, all first part of 2004), the demand for which is near exclusively of national origin. There is also a small rise in demand after the dinner time period.

The government websites have a well defined demand curve for the work hour period, with a small reduction during the lunch time period. By comparison, the CSU Forum demand is similar in the mornings, but less during the afternoons, but stays higher during the after hour period. The overall activity, on the other hand, shows that the bulk of the demand occurs between 3 and 9 pm. This pattern is most probably a combination of demand for web services both as part of business/ work (9am to 5pm) and leisure (after hours), with the after hours period for school students (starting at 3pm) driving up the demand. Common to all is that demand drops off after 10pm.

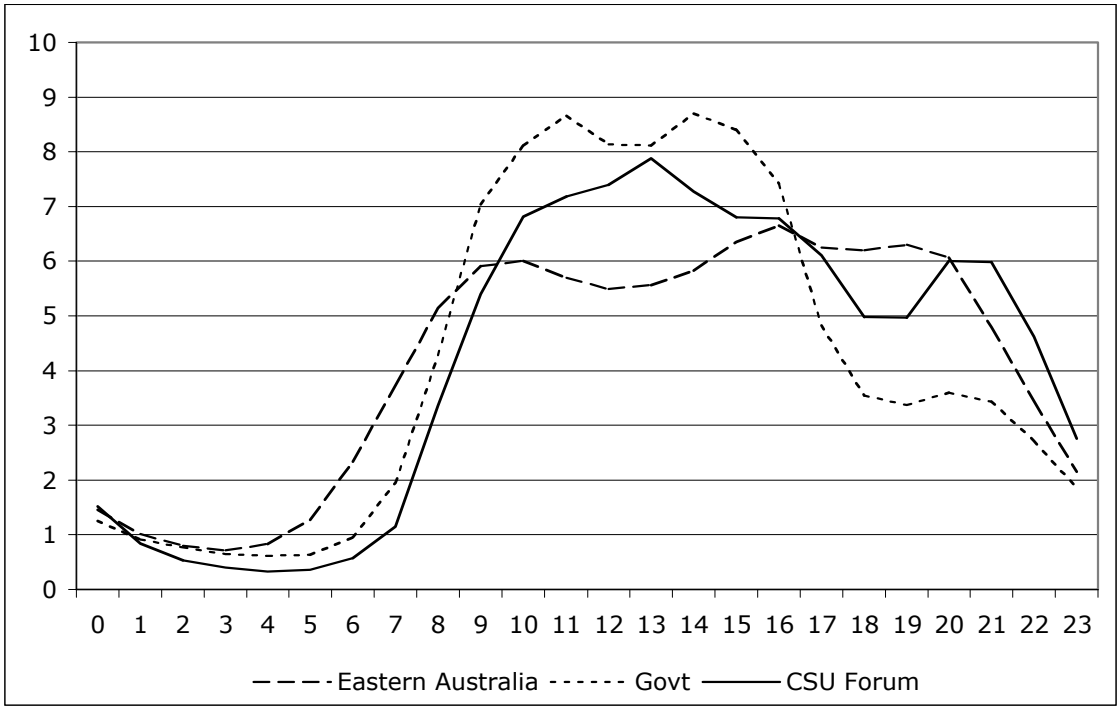

Figure 12. Diurnal variation in Forum usage compared to the demand for pages requested from Government Websites on the Eastern seaboard of Australia and the general usage of online connections

Comparison to on-campus students

Let us now compare the CSU forum use (Oct 2002) to the student presence on campus (2003), as well as to the student usage of on-campus computer laboratories (average 2001-3)(Figure 13). The on-campus presence is well defined, with a significant peak in the morning and a smaller peak in the afternoon. The computer lab usage follows the general on-campus presence for scheduled classes, but with the demand starting earlier and lasting longer. There is a small tail into the later evening/early night. Forum use, on the other hand, has a much more pronounced use during the hours of the evening and early night.

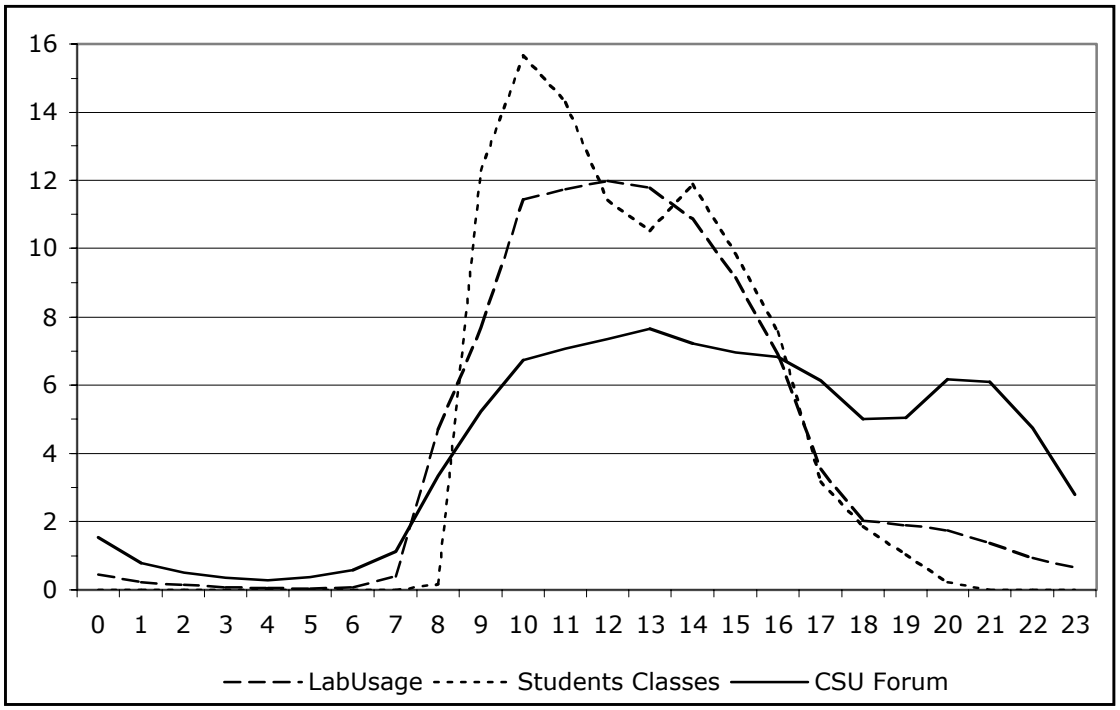

Figure 13. Comparison of student presence on-campus and on-campus computer lab usage with CSU Forum use.

Conclusion

Using a large-scale multi-year sample of Charles Sturt University online supported subjects, the patterns of annual, sessional, daily and hourly user behaviors in online forums have been developed and analyzed. It was found that, although the online environment has been developed for "any time, any place" learning, the main use is still with the "traditional" year (*i.e.* low during Christmas/New Year break), during session (*i.e.* low during session breaks and mid session breaks), "traditional" days (*i.e.* low on Saturdays and Sundays) and the "traditional" hours (*i.e.* peaks during 9 -5 office hours). The underlying reasons appear to be that students, while resource rich, are essentially time poor, juggling the demands of work, family and study. Where academics assume that holiday periods without scheduled classes and study workloads represent time-rich study opportunities, others may regard these as actually time-poor periods as out-of-school dependent children compete for time.

The diurnal analysis shows that learning does occur after hours when compared to internal students, but that very little difference exists in terms of weekend study—at least as forum viewing and posting is concerned.

The above has ramifications for resourcing the online environment and the level of support provided. For one, there is little need for costly weekend technical and instructional support. These savings are offset by additional costs requiring such support to be provided until the evening hours of 10 or 11 pm.

The data presented here, gathered over a four-year period, clearly demonstrate that the available technology does not influence study habits, but that work and study habits influence when the technology is being accessed.

Bibliography

ABS (2004) Internet Activity Australia. September 2003 ABS Publication nº 8153.0. Canberra: Australian Bureau of Statistics.

Burr, L. (2004) The Nature of Interaction within an Online Computer Mediated Environment (Thesis: Master of Philosophy, Charles Sturt University)

Burr, L. and Dawson, S. (2003) Codification of Interaction Within a Large Scale Online Forum Environment. Educause 03 Conference Proceedings, University of Adelaide.

Burr, L. and Morton-Allen, M. (2001) Inventing a Better Mouth Trap: The Development and Implementation of Forum Software at Charles Sturt University. Ausweb01. Conference Proceedings. [Online]. Available: http://ausweb.scu.edu.au/aw01/papers/refereed/burr/paper.html

Burr, L. and Smith, L. (2003) The Digital Divide: an Urban Miss? Ascilite Conference Proceedings, Adelaide, http://www.ascilite.org.au/conferences/adelaide03/program/conf_prog_index.htm

Buxton, W. (2001) Less is More (More or Less). [Online] Available: http://www.billbuxton.com/LessIsMore.html

Carskadon MA. Wolfson AR. Acebo C. Tzischinsky O. and Seifer R. (1998) Adolescent sleep patterns, circadian timing, and sleepiness at a transition to early school days. Sleep. vol.21, nº 8, pp. 871-88.

Creed, T. (1998) Extending the Classroom Walls Electronically (published in New Paradigms for College Teaching edited by Wm. E. Campbell and Karl A. Smith) http://employees.csbsju.edu/tcreed/ecw.html

De Weerd AW, van den Bossche RAS, Peeters EAJ (2003) Late in- and out of bed in teenagers. Sleep; vol. 26 (suppl.):A132-133.

Gorman, Lyn (2003) Unbounded Classrooms: NSW HSC Online as a Model for Online Delivery. Global educator.com http://www.globaled.com/articles/LynGorman2003.pdf

Knowlton, Dave S. (2004) Electronic Bulletin Boards as Medium for Asynchronous Problem Solving in Field Experiences. International Journal of Instructional Technology and Distance Learning vol. 1 no 5, pp. 43–52

Lloyd, Rachel & Bill, Anthea (2004) Australia Online: How Australians are Using Computers and the Internet 2001. Australian Census Analytic Program. Publication 2056.0 Canberra: Australian Bureau of Statistics.

Spennemann, Dirk H. R. (in press a) Just how international is my Website? Estimating the Reach through Analysis of Hourly Demand. IEE Computer Submitted

Spennemann, Dirk H.R. (2004) An Empirical Analysis of the On-Campus Presence of Students at Charles Sturt University in 2003. Bathurst, NSW: Centre for Enhancing Learning and Teaching, Charles Sturt University.

Spennemann, Dirk H.R. (in prep) Learning and Teaching 24/7: Daily Internet Usage Patterns at Nine Australian Universities. In preparation

Spennemann, Dirk H.R. (in press b) Daily Internet Usage Patterns in Australia: an Exploration. The Information Society Submitted

Spennemann, Dirk H.R., Atkinson, John, Cornforth, David & Zikesh, Clint (in prep) Sessional, weekly and diurnal patterns of computer lab usage by students. In preparation.

Theodore , Peter A. and Nelson, Wayne A. (2004) Distinctive Features of Computer-Mediated Bulletin Board Discussions. International Journal of Instructional Technology and Distance Learning vol. 1 no 8, pp. 45–58.

Virk , Bhupinder (2004) A Balancing Act: Improving Student Online Discussion Participation. International Journal of Instructional Technology and Distance Learning vol. 1 no 6, pp. 51-55.

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Leslie Burr. Les has inhabited the educational technology jungle for 25 years, discovering the food chain of educational television, computer assisted language learning, interactive video disc, videoconferencing and online learning.

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Editor's Note: Simulation and gaming have a special place in learning technologies because they are interactive and because they allow experimentation and discovery learning of multi-faceted skills in a close to real-world environment. Like most skill development, computer simulations benefit from preparation, guidance, coaching, and debriefing to optimize the learning experience. The ability to deliver these simulations online makes them a powerful alternative or supplement to work at a training site or educzational institution.

Computer Simulations in Distance Education

Les M. Lunce

Keywords: Anchored instruction, distance education, experimental learning, feedback, interactive practice, problem solving, simulation, virtual reality.

Introduction

Distance education can incorporate many types of media and instructional methodologies, including computer simulations. Computer simulations can play a crucial role in distance education because they can provide a vehicle for "interactive practice" (Berge, 2002). "Interactive practice" can enable the student to respond to new and changing information in ways which closely approximate real-life situations. This type of instructional experience can produce a depth of learning which is difficult to achieve with other modalities.

The purpose of this paper is to explore the role that computer simulations can play in distance education. Specifically, the question of whether computer simulations can contribute to the learning experience will be investigated. To explore this question, seven cases from current research of computer simulations in distance education have been selected. All research presented was conducted by academic institutions in the United States, Europe and Taiwan between 1997 and 2002. The development tools employed in these research projects included Java applets, Asymetrix ToolBook© authoring software, virtual reality and video teleconferencing. The discussion presented here will focus on the design methodologies utilized in each project. Discussion or evaluation of the specific development tools is beyond the scope of this paper.

Details of the seven selected research projects are presented under "Current Research" below.

Definitions

The terms "computer simulations" and "distance education" are used throughout this paper. These terms are defined as follows:

Distance education. An institution-based formal education delivered in a setting or situation in which the instructor and learner are separated by distance, by time, or by both time and distance (Simonson, et. al., 2001). Further, "distance education employs media and technology", often the World Wide Web (Web), to facilitate "two-way communication" between the teacher and the student (Ko & Rosen, 2001). Finally, "instruction tends to be focused on the needs of the individual student" rather than addressing students as a group (McIsaac & Gunawardena, 1996). In distance education, "the student controls", to a large degree, location, time, and pace of learning (Evans & Fan, 2002).

Computer simulation. A computer model of a real-life system or process represented in an abstracted or scaled-down form (Heinich, et. al. 1999; Sternberg, 1999). Users of computer simulations may interact with other people or with elements of a simulated environment.

Computer simulations can be powerful tools for analyzing, designing, and interacting with complex systems or processes. Well-designed computer simulations provide a model of those elements most relevant to the immediate learning objective. In addition, "they inform the instructor and the learner of aspects of the real-life system or process that have been simplified" or eliminated (Heinich, et. al., 1999; Sternberg, 1999). Effective computer simulations are built upon "mathematical models" in order to accurately depict the phenomena or process to be studied (Min, 2002). At the same time, "computer simulations have been found to be most effective for learning when unimportant aspects of the real-life situation or process are eliminated from the simulation" (Granland, et. al., 2000).

Why Computer Simulations?

Computer simulations provide a method for checking our understanding of the real world by modeling the structure and dynamics of a conceptual system or a real environment. They facilitate "interactive practice" of real-world skills by focusing on essential elements of a real problem or system (Heinich, et. al., 1999). Computer simulations can "communicate complex and technical scientific information" similar to interactive museum exhibits (Saul, 2001). A well-designed computer simulation can engage the learner in interaction by helping the learner to predict the course and results of certain actions, understand why observed events occur, explore the effects of modifying preliminary conclusions, evaluate ideas, gain insight and stimulate critical thinking. Computer simulations can also provide the learner with "feedback throughout the learning process" (Granland, et. al., 2000). Because "computer simulations are flexible and dynamic", they can guide the learner in the achievement of specific learning goals (Gibbons, et. al., 1997). Finally, computer simulations permit the learner to experience or experiment with problems that would be too dangerous or expensive to explore in reality. The facility to "explore hypothetical scenarios and test hypothesis" makes computer simulations an important tool in science education (Forinash & Wisman, 2001). Through the use of "Java applets" computer simulations can now be delivered over the Web making them a viable component in the distance learning experience (Granland, et. al., 2000; Osciak & Milheim, 2001).

Computer simulations do have distinct disadvantages compared with other modalities. First, because computer simulations are often used with "problem-based learning" methods, they stimulate learners to immerse themselves in a problematic situation and experiment with different approaches (Heinich, et. al., 1999). This type of learning may require significantly more time than other methods of instruction. Second, research has shown that, without coaching, the learner gains little from "discovery learning" from computer simulations (Min, 2001; Heinich, et. al., 1999). Third, constructivists argue that computer simulations "oversimplify the complexities of real-life situations", giving the learner a "false understanding" of a real life problem or system (Heinich, et. al., 1999). Finally, development of computer simulations may involve extensive planning and require significant investment of labor and financial resources.

Current Research

The use of computer simulations in distance education is a relatively new phenomena and research in this area is limited. Even so there are ongoing efforts towards developing and studying the use of computer simulations in distance education illustrated by seven simulation projects:

1. Open Software Solutions

Sharp and Hall (2000) reported on a case study of a software engineering course offered through the Open University in the United Kingdom (UK). Students enrolled in the course interacted with

a “multimedia computer simulation” of a software publishing house. The object of the simulation was to give students a feel for participating in a software development team in a realistic workplace setting. The computer simulation allowed students to make choices based on incomplete information and to see the consequences of their choices. The learning objective of the simulation was “anchored instruction”, resulting in a self-motivated and relevant learning experience (Heinich, et. al., 1999). The materials presented in the computer simulation were supported and supplemented by a course pack of printed materials sent to each student. The course pack contained basic information while the computer simulation provided challenging applications of basic knowledge and skills. In addition, each student was assigned to a tutor / coach who offered support and guidance by email or telephone.

Feedback is an essential element in any learning experience (Gagne, et. al., 1992). In the case of the software publishing house computer simulation, a significant feedback element was provided by the simulation software itself. This feedback was presented to the student in the form of suggested solutions to sample problems.

To gauge the effectiveness of the simulation, the authors collected user feedback through questionnaires and usability studies. Although results were mixed, in general students viewed the computer simulation as engaging and easy to use. Positive responses to the simulation focused on the inclusion of real-world case studies. Negative responses addressed the relevance of the simulation’s multimedia interface to the course and the amount of time required to work through the course pack.

The distance education course discussed by Sharp and Hall (2000) is the subject of ongoing study. The efficacy of computer simulations in distance education courses is supported by data indicating that students recognized and valued the real-world learning experience facilitated by the simulation.

2. A VR-enhanced Computer Simulation

Some researchers and educational practitioners have explored the use of virtual reality (VR) in distance education as a means of facilitating constructivist learning activities (Briggs, May, 2002; Miettinen, 2002). Sung and Ou (2001) reported on a Web-based computer graphics course in which VR technology was incorporated into a computer simulation. The goal was to increase learning effectiveness. The computer graphics course was offered through the Department of Electrical Engineering, National Central University, Chung-Li, Taiwan. http://www.ncu.edu.tw/English/. The authors asserted that learning acquired by students through a VR-enhanced computer simulation was more meaningful because it was derived from the student’s own exploration of the simulation environment (McLellan, 1994).

Preliminary analysis of the effectiveness of the VR-enhanced computer simulation was determined by administering a pre-test and post-test both to students who used the simulation and students who used more traditional learning systems. Test results indicated that students who used the VR-enhanced computer simulation scored higher on practical examinations (post-test). The authors also observed that students who had access to the VR-enhanced computer simulation returned frequently to the course Web site to refresh their skills. In addition, these students were observed to retain a higher level of cognitive knowledge than students who had not used the simulation. Students reported that using the VR-enhanced computer simulation was a rewarding and positive experience. Further, students viewed the simulation more as a computer game with instructional value than as a homework assignment. As a result, students were willing to devote more time working in the VR-enhanced computer simulation than they would have allocated to more traditional study.

The authors concluded by stating that VR-enhanced computer simulations provided students with

"experiential learning" (Sung & Ou, 2001). This type of high-level learning was possible because the simulation involved the student in active completion of specific tasks and complex operations. Research has shown that students involved in "experiential learning" tend to remember 90% of what they encounter in the course of the learning activity (Heinich, et. al., 1999). If VR-enhanced computer simulations can provide this type of learning experience over the Web, then they may have a place in distance education (Ryhme, 2002).

3. Java Applet-based Micro Worlds

A variety of technologies may be used to deliver computer simulations through distance education. Min (2001) reported on an ambitious project conducted at the University of Twente in the Netherlands, http://www.utwente.nl/en/, in which Java applets were used to deploy computer simulations to students in an array of distance settings. These Java applet-based computer simulations, referred to as, "micro worlds", were designed to be downloaded over the Web (Min, 2001).

The computer simulations developed by Min and colleagues were strongly grounded in constructivist learning theory and Vygotsky's "Zone of Proximal Development" (ZPD) concept (Sternberg, 1999; Miettinen, 2002). Min stated that these were model-driven stand-alone simulations as distinguished from instructional or tutorial courseware. The computer simulations were designed to fulfill the rolls of in-class demonstration, coached learning, individual discovery learning, interactive practice, and assessment. Of equal importance, the computer simulations provided a vehicle for evaluating whether students successfully applied what they had learned to practical problems. Min also stressed the vital role computer simulations played as a feedback channel for the instructor.

Min stated that successful application of computer simulations demanded "coached learning, two-way communication, feedback, demonstrated ability of the student to form sound hypotheses, access to appropriate manuals, written assignments and well-designed printed materials". Without these elements, the computer simulations could not have achieved their instructional goals. Min observed that the more time students spent working in the computer simulations the more the students learned. However, Min also noted that if the student used the computer simulations without coaching, the result was often ineffective practice. Further, if the student interacted with the simulations without first mastering the appropriate problem related skills, the interactive practice often resulted in null or incorrect learning.

The computer simulations developed by Min and colleagues supported discovery learning through the use of cases and scientific experiments. Each case was presented to the student in print format with the essential dynamic elements of the case portrayed by computer simulations. The student was directed to construct and test a hypothesis, and manipulate one or more parameters of the computer simulation until the simulation model behaved normally. Scientific experiments were designed to resemble vocational practicums in which the student measured specific variables with the goal of attaining a certain insight. Results of the experiment were recorded by the student in an electronic or paper worksheet. The student then constructed charts or used other graphic representations to visualize the results of the experiments. Finally, the student evaluated the resulting visual representations with the goal of gaining insight into a real-world phenomenon.

While Min did not report quantitative data on use of Java applet-based computer simulations in distance education courses, the potential of the technology is clear. Given the relatively small file sizes of Java applets and the ease with which they can be accessed through the Web, the Java applet computer simulations described by Min may be applicable to a wide range of distance education situations.

4. "Chernobyl", "C^3 Fire" and "ERCIS"

The Web may prove to be the most functional vehicle for "delivering computer simulations to students at a distance" (Simonson, et. al., 2001). Granland, Bergland and Eriksson (2000) reported on the development of three Web-based computer simulations for distance education, conducted in the Department of Computer and Information Science, Linköping University, Linköping, Sweden. The authors focused on the relationships between Web-based computer simulations and instructional strategies appropriate to simulation-based learning environments. A number of learning methodologies for which computer simulations may provide optimal learning outcomes were presented. These methodologies included problem-solving, demonstration, experimentation, exploration and hypotheses testing.

The three computer simulations presented by Granland, Bergland and Eriksson were named, "Chernobyl", "C^3 Fire" and "ERCIS". All three computer simulations were implemented using Java applets. The "Chernobyl" computer simulation was designed to teach basic operations of a nuclear power plant as well as rule-based modeling. The simulation introduced plant operations and allowed the student to deal with certain malfunctions which can occur during the course of normal plant operation. The "Chernobyl" simulation included three prewritten cases and one random case in which events were not determined in advance. While the simplified physics model on which the simulation was built was inaccurate, the simulation did familiarize the student with the dynamics of a real-world situation.

The "C^3 Fire" computer simulation was designed to present "Command, Control and Communication" (C^3 Fire) problems in a Web-based learning environment. The goal of the simulation was to let the student experiment with various strategies for team training, coordination and situation-awareness. The metaphor for the simulation was fighting forest fires and included fire fighting units, vegetation, houses and other simulated agents. Fire-fighting was used merely as a vehicle to demonstrate the problem solving principles inherent in team management. "C^3 Fire" was designed to allow the learner to experience some of the dynamics present in a real-world emergency situation. To facilitate this, the fire-fighting scenario played out by the simulation changed autonomously and in response to the learner's actions. The simulation maintained a detailed log of the learner's actions and reactions to the changing scenario. This log was later used by the instructor to evaluate the learner's performance.

"ERCIS" and "C^3 Fire" both utilized a team distance learning environment as opposed to a single user simulation demonstrated in "Chernobyl". "ERCIS" (group distance exERCISe) simulated certain key aspects of the RBS-70 unit of Swedish Anti-Aircraft Defense. The goal of "ERCIS" was to provide "training" with equipment and procedures related to the RBS-70 unit (Noble, 2002). The simulation abstracted some aspects of the RBS-70 technology, focusing rather on key functions and operation parameters relevant to group activity in a real-world combat setting.

All three simulations presented by Granland, Bergland and Eriksson shared the goal of helping the learner distinguish between conceptual and operational knowledge. Subsequent to observation and evolution of the simulations, the authors concluded that the "Chernobyl" simulation provided the learner with a good understanding of the underlying model upon which the simulation is built. The "C^3 Fire" simulation allowed the student to learn about various aspects of a dynamic situation where the model underlying the simulation was not the focus of instruction. The "ERCIS" simulation facilitated mastery of operational knowledge in a situation where the concepts and user interface of the simulation model closely resembled a real-world setting. All three simulations focused on discovery learning in which the student explored the simulation environment, collected data, analyzed information, and made informed decisions in order to acquire knowledge. Further, the simulations were designed to emphasize affective learning, incorporating as much motivation appeal as possible.

Although all three computer simulations were designed for use over the Web in a distance education setting, the authors stressed the need for teacher-guided learning and instructional feedback (Nator, et. al., 2002). While the authors presented no data in support of their research, they asserted that Web-based computer simulations have two key advantages for distance education. The first and most obvious advantage is that computer simulations built with Java applets are easily and widely accessible to any student with Internet access. Java applets can provide the flexibility to "address different learning styles and provide access to a variety of media elements" (Roccetti & Salomoni, 2001). Second, and more importantly, computer simulations can present the learner with opportunities to experience dynamic and interactive environments. The value of "experiential learning" has been well documented in the literature (Heinich, et. al., 1999). If well-designed, model-based computer simulations can be made available over the Web, students in distance settings can engage in "real-world problem-based learning" (Notar, et. al., 2002).

5. "MODEM"

Hensgens, et al, (1998) reported on the "MODEM" project (Multimedia Optimisation [sic] and Demonstration for Education in MicroElectronics) http://www.ecotec.com/sharedtetriss/projects/files/modem.html, an effort to support active learning through the use of computer simulations in a distance learning setting. "MODEM" was developed at the Research Institute for Knowledge Systems(RIKS bv), Maastricht, The Netherlands. The goal of the "MODEM" project was to allow students to acquire complex knowledge and skills relevant to the microelectronics industry through experience with professional microelectronics modeling software tools. Through hands-on experience with real-world tools in a simulated work environment, students were able to explore and experience the key concepts of microelectronics modeling.

The "MODEM" simulation incorporated access to real-world software tools which ran on a server. This was facilitated by a software bridge which connected desktop PCs at a distance to a UNIX server using the PC-X-server, HCLeXceed. Multimedia and hypermedia were extensively utilized throughout the "MODEM" simulation to support constructivist learning, interactivity and maximum learner control. The simulation promoted learning by doing; students were free to make mistakes and acquire knowledge from solutions they developed. Further, the "MODEM" computer simulation motivated students to build and test their own hypothesis acquiring high-level knowledge through development of complex problem-solving skills. Finally, because the "MODEM" simulation was delivered over the Web, it eliminated the same-time same-place constraint present in more traditional microelectronics instruction.

The "MODEM" simulation software was developed using Asymetrix ToolBook © authoring tool http://www.asymetrix.com/en/toolbook/index.asp and designed to run in either Netscape or Internet Explorer Web browsers. Synchronous communication among students and between students and teachers were facilitated with Microsoft's NetMeeting© software http://www.microsoft.com/windows/netmeeting/. The whiteboard functions of NetMeeting were used extensively for feedback and collaborative work. While the "MODEM" simulation was designed to provide the learner with full control over the course materials, extensive feedback and coaching were provided through NetMeeting. The authors stressed that coaching and guidance were essential to prevent the learner from becoming lost in the simulation.

Evaluation of the "MODEM" computer simulation was conducted at the University of Leeds and the University of Twente. Data was collected by administering usability questionnaires to a small group of software testers. The authors reported an overall positive response to the simulation, although no quantitative data were provided. Subsequent testing was carried out with students, all of whom were experienced computer users. Upon completion of the microelectronics course, the

students were asked to complete the same usability questionnaires previously presented to the software testers. Once again, the authors reported very positive student response to the simulation, but provided no supporting data. In particular, students commented most favorably about instructor feedback made possible by the NetMeeting software. Although some technical communication problems did arise during the course, students worked around these difficulties and did not consider them a negative aspect of their experience with the "MODEM" simulation.

The authors emphasized that the "MODEM" simulation was unique because it incorporated access to real-world resources and was built partially around existing software, i.e. NetMeeting. That part of the simulation constructed with ToolBook was designed to bring the preexisting software packages together under a coherent user interface, provide consistent and relevant feedback, and give students complete access to all course materials. The ToolBook user interface also facilitated note taking and collaborative work. The authors stated that "MODEM" represented a viable and cost effective approach to the development of computer simulations.

6. Computer Simulation Using Video Teleconferencing

Computer simulations can be incorporated into a wide variety of distance education situations. The medical education community has investigated the use of computer simulations incorporating "video teleconferencing" to supplement traditional face-to-face instruction (Heinich, et. al., 1999; Jacobs & Rodgers, 1997). These efforts have been motivated by the constantly expanding curriculum of most medical training programs. At the same time, educators have investigated ways of getting medical students more actively involved in their own learning (Levison & Straumanis, 2002).

Cooper, et. al., (2000) reported on a realistic medical simulation project conducted by the Center for Medical Simulations, Boston, MA. The first phase of the project was carried out at Massachusetts General Hospital on May 22, 1997. The project consisted of several two-way, interactive seminars in which medical cases were presented to large audiences at widely dispersed locations. Although the primary information delivery medium in this project was video teleconferencing, computer simulation was used for medical telemetry.

According to the authors, these medical simulations were focused on the goals of allowing students to see the effects of their actions in real-time, to enhance learning by facilitating concurrent presentation and discussion and to facilitate student participation at a distance. The simulations made it possible for students to conduct hypotheses testing in real-time and discover cause-and-effect relationships which more traditional instructional methods might have rendered less apparent. An added benefit was that students were able to "observe and interact with medical equipment which was in limited supply or inaccessible for viewing by large groups" (Forinash & Wisman, 2001).

Although the authors did not conduct a large-scale assessment of the simulation project, a survey instrument was administered to one of the largest audience groups to assess user reactions to the methodology. Survey responses were generally enthusiastic with regard to the technology, although some respondents questioned the cost-benefit ratio.

Further experimentation with this type of simulation has been held back due to the high bandwidth requirements of video teleconferencing. However, the development of streaming video may facilitate future research projects of this type. The authors stressed the need for development of additional simulations so that more comprehensive data could be collected as to the methodology's efficacy.

7. Assessment Instrument for Computer Simulations in Distance Education

A number of research projects have been presented in which computer simulations have been incorporated into open or distance-learning venues. Although the authors of these projects have attested to their success, their claims have not been supported with quantitative data. The need for reliable assessment instruments for evaluation of computer simulations is warranted.

Dean and Webster (2000) examined an interactive computer simulation in the context of a distance education business degree course. Their goals were to develop an instrument to assess whether computer simulations motivate "high quality learning", and to determine whether computer simulations impact student's ability to transfer knowledge to the real-world. High quality learning is essential for moving the student to a state of "metacognition" where the student takes responsibility for his/her own learning (Sternberg, 1999). The authors asserted that the variable and inconclusive results obtained with existing assessment instruments pointed to the need for new assessment tools geared toward computer simulations in distance settings. Because computer simulations tend to focus on the student-centered learning, the authors stated that any new assessment instrument needed to be more focused on student-related factors.

The computer simulation used in this study was designed to support development of cognitive models, provide interactive practice, encourage hypothesis formation, hypothesis testing, experimentation and mastery of concepts through application of knowledge to real-world problems. The simulation involved the student in theory-and-practice exercises with the goal of enabling the student to apply acquired knowledge to realistic work environments. The simulation software was built on a decision support system and tutorial which encouraged the student to apply acquired knowledge to work-based decision making. Interactive practice was achieved by allowing students to make their own decisions through a series of scenarios presented by the simulation. Students received feedback about their decisions and guidance with regard to factors not considered. Direct face-to-face interaction with instructors or other students was very limited during the study. Most feedback came to the student through the simulation.

The authors conducted an assessment by distributing survey instrument to 150 students who had completed the business course using the computer simulation. Detailed quantitative results presented by the authors indicated that current computer simulations do not promote transfer of knowledge to a greater degree than other methodologies. In short, computer simulations as currently constructed for distance education do not appear to facilitate transfer learning of acquired knowledge to real-world situations. At the same time, survey results indicated that students responded positively to the high degree of interactivity. In this regard, computer simulations do appear to have a positive impact on students' motivation to study.

The authors encouraged others to develop similar instruments for assessment of computer simulations delivered to students at a distance. However, the authors cautioned that such instruments should be carefully crafted to focus on student-related factors as well as factors pertaining to cognition, transfer learning and motivation.

Conclusions

The goal of this paper has been to investigate current developments in the use of computer simulations in distance education. Seven research projects have been discussed to ascertain whether computer simulation may constitute a viable component in distance education. The tools utilized by these research projects for the development of computer simulations included Java applets, Asymetrix ToolBook© authoring software, virtual reality and video teleconferencing. For the purpose of this paper, discussion of these research projects has focused on the design methodologies employed rather than the specific development tools. Further, while a variety of

media were presented for "delivery of computer simulations", a comprehensive inventory of delivery options was not attempted (Evans, & Fan, November 4, 2002).

Seven applications of computer simulations in distance education settings have been presented. Sharp and Hall (2000) reported that students in an engineering course offered via distance education responded positively to a computer simulation of a software publishing company. Students found real-world case studies presented through simulation engaging and easy to use.

In another distance education setting, Sung and Ou (2001) administered a pre-test and post-test to students in a computer graphics course to gauge the effectiveness of a VR-enhanced simulation. Test results indicated that students who used the VR-enhanced computer simulation scored higher on practical examinations (post-test). The authors also observed that students who made frequent use of VR-enhanced computer simulation retained a higher level of cognitive knowledge than students who did not use the simulation. Finally, the authors reported that student response to the VR-enhanced computer simulation was positive as demonstrated by willingness to devote more time working in the simulation than to more traditional study methods.

Min (2001) discussed Java-applet-based computer simulations which supported discovery learning through the use of cases and scientific experiments. These applets were designed to facilitate experiential learning and the application of knowledge to real-word problems. The applets also augmented feedback and assessment of student performance. While no data were reported, the author made a solid case for the efficacy of Java-applet-based computer simulations in distance education.

Granland, Bergland and Eriksson (2000) reported on three Web-based computer simulations for distance education. These simulations facilitated discovery learning in which the student explored the simulation environment, collected data, analyzed information, and made informed decisions in order to acquire knowledge. The authors asserted that well-designed, Web-accessible, model-based computer simulations can allow students in distance settings to engage in real-world problem-based learning.

Hensgens, et al, (1998) presented "MODEM", a microelectronics course computer simulation for distance education which incorporated access to real-world resources and was built partially around existing software. The simulation was evaluated by collecting data from usability questionnaires administered to software testers, and subsequently to students. The authors reported an overall positive response to the simulation, but provided no detailed data.

Cooper, et. al., (2000) reported on a medical simulation project which incorporated video teleconferencing. The goal of the project was to help motivate medical students to take a more active role in their own learning. The simulation permitted students at a distance to conduct hypotheses testing in real-time and discover cause-and-effect relationships. A survey instrument was administered to one group of distance students to gauge reactions to the simulation. The authors reported that student responses were generally positive.

Dean and Webster (2000) examined an interactive computer simulation in the context of a distance education business course with the goal of developing an assessment instrument. The instrument was designed to measure the degree to which computer simulations motivate high quality learning, and to determine whether computer simulations impact student's ability to transfer knowledge to the real-world. The authors reported detailed results obtained from a survey instrument distributed to 150 students. Data indicated that use of computer simulations in distance education do not promote transfer of knowledge to a greater degree than other methodologies. However, data did appear to support the author's claim that computer simulations can have a positive impact on students' motivation to study.

Granland, Bergland and Eriksson (2000) reported no data on the simulation they discussed.

However, authors of the other six projects reported positive responses to the computer simulations they studied. Such positive responses from students indicate that computer simulations can contribute to the learning experience in distance education. Further data collection, observation and assessment are essential for determining the best use of computer simulations in distance education.

The application of computer simulations in distance education is a new area of study which seems to hold the promise of high-quality learning. While innovative and intriguing research is currently ongoing, future research efforts should be focused on several specific areas.

First, there is an apparent lack of quantitative data on the efficacy of computer simulations in distance education settings. Further studies need to be conducted using larger treatment and control groups.

Second, the functionality of various development tools should be investigated.

Third, development of computer simulations can be expensive and time-consuming. Knowing which tools can provide the shortest development cycle while still resulting in the highest quality simulations will be important.

Fourth, the development of computer simulations in the humanities or social sciences distance education should be documented.

Finally, more effort should be devoted to developing assessment instruments that accurately measure the efficacy of computer simulations in distance education.

The benefits of "high-quality learning", which simulations can provide to the student, are well documented in the literature (Forinash, & Wisman, September, 2001). However, further research will be essential in ascertaining the degree to which the instructional benefits of computer simulations may be extended to distance education.

References

Berge, Z. L. (Summer, 2002). Active, Interactive and Reflective eLearning. *Quarterly Review of Distance Education*, 3(2), 181-90.

Briggs, J. C. (May, 2002). Virtual Reality is Getting Real: Prepare to Meet Your Clone. *Futurist,* 36(3), 34-42.

Cooper, J. B., Baron, D., Blum, R., Davison, K., Feinstein, D., Halasz, J., et. al. (May, 2000). Video Teleconferencing with Realistic Simulation for Medical Education. *Journal of Clinical Anesthesia*, 12, 256-261.

Dean, A. M. & Webster, L. (2000). Simulation in Distance Education: Progress towards an Evaluation Instrument. *Distance Education*, 21(2), 344-360.

Evans, C. & Fan, F. P. (November 4, 2002). Lifelong Learning through the Virtual University. *Campus-Wide Information Systems*, 19(4), 127-134.

Forinash, K. & Wisman, R. (September, 2001). The Viability of Distance Education Science Laboratories. *T H E Journal (Technological Horizons in Education),* 29(2), 38.

Gagne, R. M., Briggs, L. J. & Wager, W. W. (1992). Principles of Instructional Design. (4th ed). (pp. 196-197). Fort Worth, Texas: Holt, Rinehart & Winston.

Gibbons, A. S., Fairweather, P. G., Anderson, T. A., & Merrill, M. D. (1997). Simulation and computer-based instruction: A future view. In C. R. Dills and A. J. Romiszowski (Eds.) Instructional Development: State of the Art. (pp. 772-783). Englewood Cliffs, New Jersey: Instructional Technology Publications.

Granland R., Bergland, E., & Eriksson, H. (2000). Designing Web-based Simulation for Learning. *Future Generation Computer Systems*, 17, 171-185.

Heinich, R., Molenda, M., Russell, J., & Smaldino, S. (1999). Instructional Media and Technologies for Learning. (6th ed). (pp. 14-15, 21, 213-214, 290-291, 319-324). Upper Saddle River, New Jersey: Prentice-Hall.

Hensgens, J, van Rosmalen, P. & Hanu, B. (1998). Microelectronics Simulation-based Training on a Virtual Campus. *Displays,* 18, 221-229.

Jacobs, G. & Rodgers, C. (October, 1997). Remote Teaching with Digital Video: A Trans-National Experience. British Journal of Educational Technology, 28(4), 292-304.

Ko, S. & Rossen, S. (2001). Teaching Online: A Practical Guide. (pp. 2, 17-18, 51, 112-123, 197). New York: Houghton Mifflin Company.

Levison, S. P. & Straumanis, J. (Sep./Oct. 2002). FIPSE: Changing Medical Education Forever. *Change,* 34(5), 18-26.

McIssac, M. S., & Gunawardena, C. N. (1996). *Distance education. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology* (pp. 403-437). New York: Simon & Schuster Macmillan.

McLellan, H. (1996). Virtual Realities. In D. H. Jonassen (Ed.), Handbook of Research for Educational Communications and Technology: A Project of the Association for Educational Communications and Technology, (pp. 457-487). New York, NY: Macmillan.

Miettinen, R. (2002). Varieties of Constructivism in Education: Where Do We Stand? *Lifelong Learning in Europe*, 7(1), 41-48.

Min, R. (2001). Designing Dynamical Learning Environments for Simulation: Micro-Worlds Applets on the World Wide Web. 6th Proceedings of EARLI, SIG, June 27-29, 2002, in Erfurt, Germany.

Min, R. (2001). Simulation and Discovery Learning in an Age of Zapping & Searching: Learning Models. Retrieved February 24, 2002, from: http://projects.edte.utwente.nl/pi/Papers/DiscLearning.html.

Noble, D. F. (2002). Digital Diploma Mills: The Automation of Higher Education. (pp. 2). New York. Monthly Review Press.

Notar, C. E., Wilson, J. D. & Ross, K. G. (Summer 2002). Distant Learning for the Development of Higher-level Cognitive Skills. *Education*, 122(4), 642-648.

Osciak, S. Y. & Milheim, W. D. (Winter, 2001). Multiple Intelligence and the Design of Web-based Instruction. *International Journal of Instructional Media,* 28(4), 355-362.

Rhyne, T. (July, 2002). Computer Games and Scientific Visualization: How Should Scientists Approach the Innovations in Visualization--rendering Systems Increasingly Derived from Computer Game Tools, Interfaces, Navigation Techniques, and Plot Lines? *Communications of the ACM*, 45(7), 40-45.

Roccetti, M. & Salomoni, P. (2001). A Web-based Synchronized Multimedia System for Distance Education. *ACM*, 94-98.

Saul, C. (February, 2001). Modeling Information for Three-dimensional Space: Lessons Learned from Museum Exhibit Design. *Technical Communications*, 48(1), 66-81.

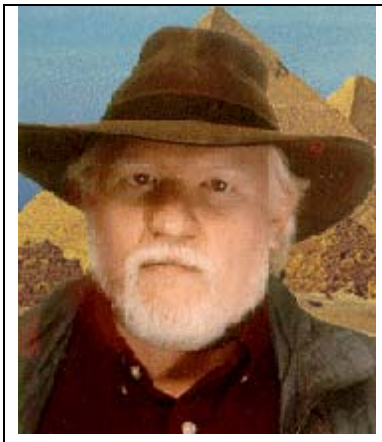
Sharp, H. & Hall, P. (2000). An Interactive Multimedia Software House Simulation for Postgraduate Software Engineers. *ICSE*, 688-691.

Simonson, M., Smaldino, S., Albright, M. & Zvacek, S. (2001). Teaching and Learning at a Distance. (2nd ed.). (pp. 7-9, 87-88, 253-257). Upper Saddle River, New Jersey: Pearson Education, Inc.

Sternberg, R. J. Cognitive Psychology. (1999). (2nd ed.). (pp. 17, 186, 446-449). Fort Worth, Texas: Harcourt Brace College Publications.

Sung, W. & Ou, S. (2001). Application of Web-based Learning in Sculpture Curves and Surfaces. *IEEE*, 121-122.

About the Author



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Editor's Note: Art and science may be two ways to achieve the same result. When we achieve success in a particular teaching - learning experience, we try to determine the reasons so we can replicate success.

If we achieve the result intuitively we call it art; if we identify and manage significant elements, we call it science. Research is an attempt to identify, relate, apply, and measure the impact of significant elements. This study researches reasons for a significantly lower dropout rate for online compared to print based independent learning among high school students.

Distance Education: The Impact of Goal Orientation, Motivational Beliefs and Strategies, and Course Satisfaction

Terrie Nagel

Keywords: Distance education, goal orientation, motivation, self-efficacy, course satisfaction, retention, mastery goals, performance goals, academic self-handicapping

Abstract

The primary purpose of this study was to investigate course satisfaction, goal orientations, and motivational beliefs and strategies of students enrolled in print and online independent study courses. Completion rates for online high school courses have been approximately twice that for print high school courses for several of the last fiscal years. One of the first steps in understanding why was to develop student characteristic profiles for those enrolled.

A total of 160 university and high school students enrolled in print and online versions of the same independent study courses were surveyed. Factor and discriminant analyses were conducted to evaluate the survey data collected and develop prediction equations for those enrolling in online versus print-based courses. The analysis was somewhat successful in predicting group membership for university and high school course enrollments based on three factor scores. The discriminant function analysis at the high school level approached significant differences between groups for the third factor, which consisted of several self-handicapping items. Many institutions are beginning to offer entire degree or high school diploma programs online; the implications of examining these topics extend worldwide due to these trends.

Introduction

This study is about a segment of distance education known as independent study. The Center for Distance and Independent Study (CDIS) at the University of Missouri offers a choice of two delivery methods, print-based or online, for many of its courses. While delivery methods are different, courses with the same title include the same course content. Despite the similarity in content, a substantial difference in student retention rates at CDIS has occurred, depending on the delivery method chosen to complete the course. This study focuses on a comparison of student characteristics such as course satisfaction, goal orientations, and motivational beliefs and strategies of students enrolled in high school and university print-based and online courses at CDIS in an effort to understand which student characteristics, if any, facilitate success given the delivery method chosen.

Considerable research exists concerning how classroom environments influence student learning, goals, and academic motivational outcomes (Ames, 1992). Little research exists concerning the

goals and motivational attributes of students enrolled in distance education courses. Phipps and Merisotis (1999) found that certain gaps existed in the distance education research base they reviewed from the 1990s, with one gap consisting of the failure to take into account differences among students.

An interesting trend at CDIS concerning online and print-based enrollments is the difference in course completion rates. For example, completion rates for online high school courses were approximately twice that for print high school courses during several of the last fiscal years. Since retention is a factor of great interest to those in the independent study field, this trend is of some import, and research should be conducted to help understand the reasons, since the literature is lacking in this area.

The purpose of the study was to investigate which variables differed on students enrolled in print-based and online independent study courses. The goal of the study was to use goal orientation, motivational beliefs and strategies, and student satisfaction variables to make prediction equations of who is likely to enroll in, and complete or withdraw from, online versus print-based independent study courses. In addition to providing data that could aid in instructional design and potentially improve learning outcomes, demographic characteristics of students enrolled in online and print-based versions of the same course were also determined; these areas are currently unresearched in the literature.

One set of research questions addressed in this study was whether high school and university online versus print-based course enrollment could be predicted by goal orientation, motivational beliefs and strategies, and course satisfaction. It was predicted that students with mastery goal orientations were enrolling in either print or online versions, that students with performance goals were enrolling in online versions, and that students with avoidance goals were enrolling in print versions. It was also predicted that students enrolled in online courses were more satisfied with their courses, as evidenced by their survey responses. Another set of research questions addressed which characteristics—online versus print-based course enrollment, course satisfaction, goal orientation, and motivational beliefs and strategies—most likely predicted course withdrawals or completions.

Distance education delivery systems are categorized by the type of communication used between the students and the instructor, other students, or the distance provider, and the various technological options used when communicating. Willis (2000) suggested that educators focus on instructional outcomes, student needs, content requirements, and instructional constraints before a delivery system is selected, resulting in a mix of media designed to meet student needs in an instructionally effective manner. Understanding is limited concerning how the distance student, the learning task, and a particular delivery system interact (Phipps & Merisotis, 1999).

Student characteristics play a major role in the achievement and satisfaction levels of the distance learner (Phipps & Merisotis, 1999). Of the 1.6 million distance education enrollments at post-secondary institutions in 1997–98, 1.36 million were in college-level credit-granting courses, primarily at the undergraduate level (National Center for Education Statistics, 1999). Most students enrolled in distance education courses are characterized as being over 25, employed, with previous college experience (“Who is Learning,” 2001). However, these statistics do not take into account the different student populations that may comprise a particular institution’s distance education students. For example, at least two-thirds of the enrollments at CDIS are from high school students, and demographics are very different from those cited (Center for Distance and Independent Study [CDIS], 2000).

Despite a large body of research literature examining achievement outcomes in distance education, researchers have not fully investigated affective outcomes such as student satisfaction (DeBourgh, 1999). The attitudes and satisfaction of distance education students are generally

characterized as positive (Phipps & Merisotis, 1999). However, in a review of written research published in the 1990s, Phipps and Merisotis (1999) believed the overall quality of the original research was questionable because of reasons such as the use of nonrandom subjects and unreported instrument reliability and validity, which rendered many of the findings inconclusive.

Environment should be considered when studying the learner's ability to exercise autonomy (Gibson, 1990). Independent study is one of the forms of distance education that grants the greatest autonomy due to the involvement of self-pacing, self-discipline, individualized interaction, and self-directed learning (Gibson, 1990). Proponents cite several advantages of independent study such as the student's flexibility in completing course work without attending class, decreasing costs for both students and institutions (CDIS, 2000; Khan, 1997). Another advantage is that most independent study courses are asynchronous allowing the student to work on the course at his or her convenience (CDIS, 2000).

Independent study also has been criticized. Withdrawal rates may be higher than those for campus-based instruction. Moore and Kearsley (1996) estimated that in the past, 30–50% of students who started a distance education course did not complete it and that more recent withdrawal rates probably still lie at the lower end of that range. Michael Lambert, the executive director of the Distance Education and Training Council (DETC), suggests that retention rates may be lower because not everyone has the discipline and motivation to complete an independent study course on their own (Thomas, 2001). Factors such as the length of time it takes to complete an external degree and differences in services may also account for lower retention (Thomas, 2001). Another disadvantage is that the student may feel isolated or disconnected; the most-cited shortcoming is little or no face-to-face interaction between the instructor and students or between students (Thomas, 2001). However, using strategies and technologies that encourage cooperative and independent work as well as interaction can help eliminate this limitation (Hill, 1997).

Motivation

Mayer (2002) defined motivation as "an internal state that initiates and maintains goal-directed behavior" (p. 238) that is construed as personal, directed, and activating. Motivation plays a factor in a student's successful completion of independent study course work; intent to finish the course, consistent submission of work, and completion of other distance education courses influences student success and motivation (Moore & Kearsley, 1996). Other factors that potentially influence student motivation are course design, the type and amount of interaction provided and available, and the role of the offering institution or site facilitator (Cornell & Martin, 1997).

In recent years, goal orientation theory has been used in an attempt to understand the psychological processes which accompany motivational patterns, particularly the role of mastery and performance goals (Kaplan & Midgley, 1997). Goal orientation theory focuses on the goals perceived for achievement rather than the level of motivation (Middleton & Midgley, 1997). Mastery goals have been related to higher levels of self-efficacy, or perception of competence, interest, achievement, and other outcomes (Pintrich, 2000; Midgley et al., 1997). Students with mastery goal orientations believe that effort leads to a positive outcome; their self-efficacy is based upon this belief (Ames, 1992). Students with mastery goals are willing to learn and are focused on developing new skills and understanding and mastering content (Ames, 1992). Research indicates that students with mastery goals use strategic thinking strategies such as self-monitoring and deep processing (Ames, 1992).

Students with performance goals focus on self-worth and ability, judging ability by how well they perform in relation to others or how easily they achieve success with minimal effort (Ames, 1992). Public recognition of performance is important to students with performance goals (Ames,

1992). Students with performance goal orientations may refrain from challenging tasks, use superficial or short-term learning strategies such as rehearsal or memorization, and base beliefs in personal academic ability on their successes and failures (Ames, 1992). Performance goals have been less adaptive in terms of future motivation because students focus on competitive goals such as doing better than others or the avoidance of looking incompetent (Pintrich, 2000).

Students with mastery goals are likely to maintain achievement, while students with performance goals may settle into a pattern of failure avoidance, a perspective known as normative goal theory (Ames, 1992). However, in some situations, performance goals can result in superior achievement and performance, with mastery goals connected to more intrinsic preoccupation with the task (Pintrich, 2000; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000).

In this revised goal theory perspective, performance goals are divided into two categories, approach and avoidance performance goals. Students with approach performance goals are "oriented to doing better than others and to demonstrate their ability and competence" (Pintrich, 2000, p. 544). Students with avoidance performance orientations avoid tasks in order to avoid looking incompetent or stupid (Pintrich, 2000). Students may have both mastery and performance goals, possibly simultaneously (Pintrich, 2000). High levels of both mastery and approach performance goals are the most adaptive pattern of multiple goals, compared to normative goal theory which hypothesizes that the most adaptive pattern is a high mastery level accompanied by a low performance level (Pintrich, 2000).

Pintrich (2000) compared multiple goals of junior high students in math classrooms and included measures such as mastery and performance goals, self-efficacy, and motivational strategies such as self-handicapping in his research. Academic self-handicapping "refers to strategies, such as procrastinating and fooling around, that are used by students so that if subsequent performance is low, these circumstances, rather than lack of ability, will be seen as the cause" (Midgley et al., 1997, p. 10). Pintrich (2000) predicted several negative consequences would occur over time, given general research findings for motivational beliefs at the junior high level. Results for self-efficacy and other adaptive outcomes were as predicted, decreasing over time, as was the increase in maladaptive outcomes such as in self-handicapping (Pintrich, 2000).

Current research has not connected independent study with goal orientation theory, as in this study. Course structures with interesting, challenging tasks and evaluation processes that focus on effort rather than grades, that are supportive of autonomy and self-directed learning with an emphasis on independent thought and content mastery, facilitate learning and are more likely to lead to a mastery goal orientation (Ames, 1992). Such attributes of independent study as autonomy and self-paced, self-directed learning are features of course structures that may facilitate mastery goal orientations (Ames, 1992). Since most students progress through independent study course work on their own, it is less likely for judgments of ability differences or social comparisons to occur, also fostering mastery goal orientations. In terms of current research, performance goal orientation may be less important. However, students may choose a particular goal orientation based on past experiences (Ames, 1992), and some students enroll in groups, which may foster social comparison and perceptions of differences in ability. Independent study courses also include predefined assignments and examinations that determine course grades, a performance-oriented evaluation structure (Ames, 1992).

For those reasons, both mastery and performance goal orientations were of interest to this study. Goal orientation, course satisfaction, and motivational beliefs and strategies are crucial for course completion when students are enrolled on their own in a distance education course. Therefore, these measures were chosen as the measures of interest for this study.

Participants

The target population consisted of fiscal year 2001–02 CDIS enrollments in courses with both print and online versions, for a total of 61 courses. At the time of data collection, high school and university enrollments in those courses totaled 5,036 and 712, respectively, divided nearly equally between print and online enrollments.

Instruments

No published measure was found which measures the constructs of interest in relation to independent study. Therefore, a survey instrument was developed which measures goal orientation, motivational beliefs and strategies, and student satisfaction with independent study courses. Several course satisfaction questions were taken from a survey developed by CDIS used in a previous study. Most of the measures of personal goal orientation and motivational beliefs and strategies were adapted from the Patterns of Adaptive Learning Survey (PALS) (Midgley et al., 1997), which measures similar constructs for middle school and junior high students; permission was received from the authors (Midgley et al., 1997) to include those items on the survey, rewritten to be more appropriate for the older distance education audience. The PALS survey scales (Midgley et al., 1997) chosen that measure personal achievement goal orientations included three scales focused on mastery, performance approach, and performance avoidance goal orientations (α = .75 to .86). The PALS survey scales (Midgley et al., 1997) chosen to measure motivational beliefs and strategies focused on academic self-efficacy (α = .77) and self-handicapping (α = .84), respectively. In other research, these measures demonstrated good construct validity and internal consistency (Kaplan & Midgley, 1997; Midgley, Kaplan, Middleton, & Maehr, 1998).

The survey was comprised of 54 items consisting of 15 demographic, motivation, and goal-setting items; one overall course satisfaction grade; and 38 Likert items depicted on a 5-point continuum (1=strongly agree, 5=strongly disagree, N/A=does not apply). Of the 38 Likert items, 12 measured student satisfaction and 26 were achievement related. Lower scores on 11 student satisfaction items indicated greater course satisfaction; a higher score on the other student satisfaction item indicated greater course satisfaction. Of the 26 achievement-related items, five each measured mastery goal orientation and academic self-efficacy, and four each measured performance-approach goal orientation, performance-avoidance goal orientation, academic self-handicapping, and intent or schedule to complete lessons. These constructs were included in the self-developed survey instrument because they have a direct bearing on the research questions proposed in this study.

Procedures

Fiscal year 2001–02 enrollments from 61 high school and university courses served as a database of potential participants. The data was divided into four participant pools from which samples were drawn; high school and university print and online course enrollments were assessed separately so that predictor variables most accurately portrayed the populations they represented.

Stratified samples of 50 university students and 200 high school students were drawn from each set of university and high school print and online participant pools, for a total of 500 participants. The 100 university potential participants consisted of 42 males and 58 females, ranging in age from 18 to 53 with a mean age of 28.37 (*SD* = 8.719). Most were Missouri residents. Ethnicity information is self-reported and was only available for 72 of those students; 88% were Caucasian.

The 400 high school potential participants consisted of 198 males and 202 females, ranging in age from 13 to 42 with a mean age of 17.89 (*SD* = 2.306). Most were residents of the Midwest or Pennsylvania. Ethnicity information was available for 179 students; 91% were Caucasian.

A response rate of 32% was obtained, consisting of 38 university and 122 high school students. The university participants consisted of 12 males and 26 females, ranging in age from 18 to 51 with a mean age of 28.47 (*SD* = 9.150). Most were Missouri residents and 84% were Caucasian. Seventeen were enrolled in print courses and 21 were enrolled in online courses.

The 122 high school participants consisted of 40 males and 82 females, ranging in age from 13 to 42 with a mean age of 16.97 (*SD* = 2.712). Most were residents of Missouri or charter school students from Pennsylvania, and 90% were Caucasian. Sixty-eight were enrolled in print courses and 54 were enrolled in online courses.

Students enrolled in online courses were asked how often they printed lesson commentaries from their online study guide; 81% of those enrolled in the university online courses and 72% of those enrolled in high school online courses indicated that they printed the lessons out for most or all lessons. This further emphasizes the similarity between the print and online course structures.

Statistical Analyses

This study used a quasi-experimental design on one variable. The dependent or criterion variable consisted of instructional delivery method, (e.g., print-based or online) for two of the research questions, and retention (e.g., withdrew or completed) for the other two. Factor scores were created from the 38 Likert items on the survey. The factor scores were used as predictor variables in the prediction equations derived through discriminant function analysis. High school and university course enrollments were assessed separately for reasons mentioned previously.

Factor analysis was used for scale development to see which survey items were most closely associated with each other. Discriminant function analysis was used to eliminate variables if unrelated to group distinctions, to classify enrollments into groups, and to test theory by observing whether enrollments were classified as predicted. Group membership, or enrollments in print-based and online courses, was predicted based on a linear combination of the independent predictor variables. Student retention (e.g., withdrawals and completions) was also assessed based on the independent and dependent variables.

The null hypotheses were that there were no significant differences between means for the independent variables on the group variable, course delivery method or retention. A prediction was made earlier that goal orientation differed on the group variable. If the discriminant analyses produced results, MANOVA was used to provide confirmatory evidence or evidence of validity to ensure comparable findings.

Results

Before analyzing the data, it was screened for missing data, distributions, and outliers. Answers to Likert items written in a reverse fashion to avoid test bias were recoded. One question was a six-part item requesting information about use of the CDIS Web site; after running a frequency distribution, three of those items were omitted. Several students did not have a computer or Internet access and were unable to answer those items; also, Web site usage was not a primary research interest. Interitem correlations and scale reliability were calculated. Coefficient alpha for the Likert items was .82 before those items were deleted and .80 afterward. Likert items were checked for outliers, and statistics for five high school enrollments exceeded the critical values, so those outliers were discarded from further analysis, reducing the high school sample size to 117, consisting of 65 print-based enrollments and 52 online enrollments.

Internal consistency reliability for each of the subscales was calculated. Cronbach's alpha was .88 for the course satisfaction items, .75 for the mastery goal items, .55 for the performance-approach goal items, .82 for the performance-avoidance goal items, .61 for the academic self-efficacy

items, .84 for the self-handicapping items, and .67 for the intent or schedule to complete items. Internal consistency for the reversed performance-approach goal items ($\alpha = .55$) was low. Students reported a somewhat low level of performance-approach orientation for Q33 (mean = 2.62) and fairly high levels for Q34–Q36 (means of 3.59, 2.97, and 3.46, respectively). This resulted in Q33 correlating negatively with Q34–Q36. This result was not problematic because the items loaded on the same factor during the factor analysis.

Factor analysis was conducted on the Likert variables, and the initial analysis indicated five factors explained over 49% of the variance. Items were eliminated, the remaining three factors analyzed, and factor scores saved for use in the discriminant analysis. The first factor score included course satisfaction and self-efficacy items as well as two mastery goal orientation items. A mastery goal orientation is thought to lead to higher levels of self-efficacy, or perceptions of competence (Ames, 1992). Because such items were included, this factor could be considered one of course and self-satisfaction. The second factor score included both performance approach and avoidance items; it created a single measure for performance goal orientation. The third factor score was comprised of academic self-handicapping items.

High school data was assessed first in the discriminant analysis as shown in Table 1. The .057 significance value calculated for the self-handicapping factor score indicated high school print and online group differences approached significance on that factor. Means for the reversed self-handicapping items (Q46–Q49) ranged from 2.77 to 3.20 for students in print courses and 2.60 to 2.85 for students in online courses. This meant that of those high school students who responded to the survey, those in the print courses employed greater levels of self-handicapping strategies than students in the online courses.

Table 1

High School Tests of Equality of Group Means

Factor Scores	*Wilks' Lambda*	F	df1	df2	Sig.
REGR course and self-satisfaction factor score	.983	1.991	1	115	.161
REGR performance goal orientation factor score	.996	.513	1	115	.475
REGR self-handicapping factor score	.969	3.682	1	115	.057

Classification coefficients and constants were used to create a classification or prediction score for new enrollments, and the equations may be tested by placing new enrollments in the group for which its score is highest and checking that classification against actual data. The degree of success for the sample classification was calculated. The classification was fairly successful, with 64.1% being classified correctly.

University enrollments were assessed next. All records were valid, although the small $n = 38$ was a concern. The F values calculated were greater than the critical value, which indicated group differences were not significant. The classification was fairly successful, with 63.2% being classified correctly. MANOVA was used to validate, with similar results obtained. This suggested most differences between means were attributable to chance differences alone.

Since only two mastery items loaded on a factor, MANOVA was used to test the prediction that students with mastery orientations were enrolling in either print or online courses. Results were difficult to interpret since not all the mastery items loaded on a factor, but they may indicate that

students with mastery goal orientations are enrolling in either print or online courses. Effect size was .053 and .009 for the high school and university groups, respectively, which indicated only 5.3 and .9 percent of the total variability in print or online enrollment could be attributed to factor scores. Observed power of the tests was .529 and .067 for the high school and university groups, respectively. While observed power for the university sample was low due to the small sample size, observed power for the high school group was fairly good. Since the factor scores accounted for little of the total variability, other variables probably play a significant role in differences on enrollment.

The research questions that used retention (e.g., withdrew or completed) could not be assessed properly due to the small number of withdrawals for this particular sample of students. Of the 155 students, only five withdrew from their course work (two high school and three university students).

Discussion

The results of this study did not provide clear support for the original predictions. Only two of the five mastery items loaded on a factor, a combination of self-efficacy, course satisfaction, and mastery items. Because of the variety of items that comprised the course and self-satisfaction factor, it cannot be stated with certainty that students with mastery goal orientations were enrolling in either print or online versions as predicted. Results using individual mastery items, opposed to the combined course and self-satisfaction factor, were mixed but indicated overall that students with mastery goals were enrolling in either print or online courses, as predicted.

The results of the study did not provide support for the predictions that students with performance approach goals were enrolling in online versions, that students with avoidance goals were enrolling in print versions, or that students enrolled in online courses were more satisfied with their course. However, the course and self-satisfaction factor was comprised of a combination of items, and the performance approach and avoidance items all loaded onto one performance goal orientation factor and could not be differentiated. Means for several of the performance approach items indicated that students employed high levels of performance approach orientations.

The discriminant function analysis at the high school level approached significant differences between groups for the self-handicapping factor. The conclusion drawn was that for this sample of high school students, there was a possible difference between students enrolled in online and print-based courses for the self-handicapping factor, and the data indicated that students enrolled in the high school print courses employed greater levels of self-handicapping strategies than students enrolled in the high school online courses.

The analysis was somewhat successful in predicting group membership for the university and high school course enrollments based on the three factor scores. Had a sufficient number of students within each category responded to the survey, hold-out samples could have been used to validate the discriminant function. The majority of students enrolled in the online courses indicated they printed the lessons out for most or all lessons, emphasizing the similarity between the print and online course structures; however, access to course components and additional course resources remains very different for the two delivery methods, as well as lesson submission for many students. Retention trends at CDIS have been substantially better for high school students enrolled in online courses. If printing lessons meant the student was treating an online course as a print course, retention differences would not be so significant.

Some findings in this study provided preliminary evidence that a connection between independent study and goal orientation may exist. The potential positive findings for the prediction involving mastery items lend support to the theory that the autonomy and self-paced, self-regulated aspects

inherent in independent study course structures facilitate a mastery goal orientation, no matter the course delivery method. Independent study course structure exemplifies those that foster mastery goal orientations (Ames, 1992). Since means for several of the performance approach items indicated that students employed high levels of performance approach orientations, the performance-oriented evaluation structure of independent study courses and students' past experiences may factor into the particular goal orientation chosen (Ames, 1992). These findings are consistent with Ames' theories.

Another potential positive finding concerned the possible difference between high school students on the self-handicapping factor, with those enrolled in print courses employing greater levels of self-handicapping strategies than those enrolled in online courses. This was somewhat expected, given the course completion trends for the high school population. In addition, it is likely that the interactivity and novelty of the online courses increase the interest level of those enrolled, keeping those students on track academically in their course work instead of procrastinating. This finding and the high school online course completion rate give support to the trend of providing course work online and the benefits derived.

A problem in this study was one of power. One way to increase the power of the test would be to increase the sample size. The number of university students who responded was not sufficient. Since only 32% of the potential participants responded to the survey, the sample may not be representative of the true population. Those who responded may be different from those who did not; it is not known whether these results would generalize to other samples. However, the total number of those who responded was approximately equal when subdivided into the high school and university print and online groups. Demographic characteristics such as ethnicity and the geographic location of those who responded also mirrored those for the original pool of 500 potential participants. Course grade distributions were assessed for the university and high school samples and they were fairly normally distributed. Repeating the study with a different pool of participants at a later date may increase the generalizability of the findings.

The number of withdrawals in the sample was surprisingly low. Instead of surveying students during their course enrollment, it might be best to wait until students have completed their course work and revise the sampling technique to ensure more equal numbers for withdrawals and completions. Future testing should be done to validate the prediction equations derived using new survey samples. New data and random samples would cross-validate the discriminant function derived.

While the difference in retention for online and print course enrollments continues at the high school level, the retention trend for the 2002–03 fiscal year for university enrollments resulted in just as many print courses completed as online. This could be due to an increase in online enrollments resulting in a more equal balance between the two, or perhaps a leveling off of interest in new technology. At the high school level, increased interest, motivation, and participation may be occurring in relation to the online courses because the students are doing something different, as mentioned in relation to the self-handicapping factor.

The purpose of this study was to investigate the possibility of a link between independent study and motivational measures such as goal orientation. Since the study did not result in conclusive support for the original predictions, it is suggested that the potential links between independent study and goal orientation and the other measures be studied in greater depth using larger samples with slight modifications to the sampling method used. Future research may refine the research questions and investigate the possibility of those links more thoroughly, providing results that help with independent study student advisement and instructional design. Retention trends will continue to be assessed; if the university trend continues, potential participants should be taken from the high school population only. Additional outcome measures may need to be included in

the model, although it is possible that using larger sample sizes will result in clearing up some of the problems previously mentioned based on the small number of students who responded.

While there is substantial research concerning the components of effective instructional design, there has not yet been much exploration of student characteristics that would contribute to an overall picture of the factors that must be taken into consideration before instruction is designed and delivery methods chosen. Studies that focus on student characteristics may help in developing more successful students (Diaz, 2000). While it can be quicker to develop online courses and it can be less costly for students to access online course materials, those should not be primary reasons online curriculum is being developed. Many institutions are beginning to offer entire degree or high school diploma programs online. The implications of examining these topics extend worldwide due to these trends.

References

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of American Journal of Distance Educational Psychology, 84*(3), 261–271.

Center for Distance and Independent Study. (2000). *University of Missouri Center for Distance and Independent Study 2000–2001 university bulletin, 101*(4).

Cornell, R., & Martin, B. L. (1997). The role of motivation in Web-based instruction. In B. Khan (Ed.), *Web-based instruction* (pp. 93–100). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

DeBourgh, G. A. (1999). *Technology is the tool, teaching is the task: Student satisfaction in distance learning*. Retrieved May 5, 2002, from ERIC database (ERIC Document Reproduction Service No. ED432226).

Diaz, D. P. (2000). Carving a new path for distance education research. *The Technology Source*. Retrieved May 5, 2002, from http://ts.mivu.org/default.asp?show=article&id=648

Gibson, C. C. (1990). Learners and learning: A discussion of selected research. In M. G. Moore (Ed.), *Contemporary issues in American distance education* (pp. 121–135). Oxford, United Kingdom: Pergamon Press.

Harackiewicz, J. M., Barron, K. E., Carter, S. M., Lehto, A. T., & Elliot, A. J. (1997). Predictors and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 73*(6), 1284–1295.

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., Carter, S. M., & Elliot, A. J. (2000). Short-term and long-term consequences of achievement goals: Predicting interest and performance over time. *Journal of Educational Psychology, 92*(2), 316–330.

Hill, J. R. (1997). Distance learning environments via the World Wide Web. In B. Khan (Ed.), *Web-based instruction*, (pp. 75–80). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Kaplan, A. & Midgley, C. (1997). The effect of achievement goals: Does level of perceived academic competence make a difference? *Contemporary Educational Psychology, 22*, 415–435.

Khan, B. (1997). Web-based instruction (WBI): What is it and why is it? In B. Khan (Ed.), *Web-based instruction* (pp. 5–18). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Mayer, R. E. (2002). *The promise of educational psychology, vol. II: Teaching for meaningful learning*. Upper Saddle River, NJ: Pearson Education.

Middleton, M. J., & Midgley, C. (1997). Avoiding the demonstration of lack of ability: An underexplored aspect of goal theory. *Journal of Educational Psychology, 89*(4), 710–718.

Midgley, C., Kaplan, A., Middleton, M., & Maehr, M. L. (1998). The development and validation of scales assessing students' achievement goal orientations. *Contemporary Educational Psychology, 23*, 113–131.

Midgley, C., Maehr, M., Hicks, L., Roeser, R., Urdan, T., Anderman, E., et al. (1997). *Patterns of Adaptive Learning Survey (PALS)*. University of Michigan.

Moore, M. G., & Kearsley, G. (1996). *Distance education: A systems view*. Belmont, CA: Wadsworth.

National Center for Education Statistics. (1999). *Distance education at postsecondary education institutions: 1997–98.* (NCES No. 2000013). Washington, DC: U.S. Department of Education.

Phipps, R., & Merisotis, J. (1999). *What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education*. Retrieved May 5, 2002, from http://www.ihep.com/Pubs/PDF/Difference.pdf

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*, 544–555.

Thomas, C. (2001). Distance learning goes the distance. *Peterson's: Getting you there*. Retrieved May 5, 2002, from http://www.petersons.com/distancelearning/code/articles/distancelearngoes1.asp

Who is learning at a distance. (2001). Retrieved May 5, 2002, from http://www.petersons.com/distancelearning/code/articles/who.asp

Willis, B. (2000). Guide #1 distance education: An overview. *Distance Education at a Glance.* Retrieved May 5, 2002, from http://www.uidaho.edu/evo/dist1.html

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Editor's Note: Effective online learning requires careful preparation, design, implementation, and follow-up. This article combines best practices from a variety of resources – research studies, publications, and discussions among online instructors. The analogy of a garden is used to reinforce practices that will ensure a successful "harvest!"

Tips and Tricks for Teaching Online: How to Teach Like a Pro!

Kaye Shelton and George Saltsman

Abstract

This paper summarizes some of the best ideas and practices gathered from successful online instructors and recent literature. Suggestions include good online class design, syllabus development, and online class facilitation offering hints for success for both new and experienced online instructors.

Keywords: online education, distance education, online teaching, online instructor, online faculty training

Tips and Tricks for Teaching Online

Teaching online is a little like gardening. Like plants, students need a healthy and fertile environment if they are going to mature and thrive in their online courses. It takes planning, preparation, hard work, and enough knowledge to know what to do (and what not to do) for your labor to yield an abundant harvest. Online instruction is new to many instructors in higher education, and for good reason. In just a few years, it has grown from an academic experiment to a recognized alternative to traditional classroom learning. In fact, even traditional classes have embraced many of the teaching methods popularized by online education.

Because this instructional methodology is relatively new, many online instructors feel a bit like a novice gardener. They understand the basic concepts, but are eager to discover new tips or tricks from their colleagues. If two or more online instructors are together in a social situation, discussion will shift to war stories and proudly offered pieces of advice. This paper offers many of those tips and tricks, gathered not from the Sunday afternoon garden club, but from conversations and interviews with online instructors, current literature, conferences, email and listservs, along with personal experiences.

Teaching online shares similarities to teaching in the classroom; however, even the best traditional instructors may still find that teaching in an online environment can lead to feelings of inadequacy and being ill-prepared. Providing training and tools for ePedagogy is a way to build confidence and create successful outcomes in the online classroom. Even experienced online instructors can glean helpful and timesaving ideas from tips shared by other instructors.

VanSickle (2003) recognized that a new online instructor should understand how the Internet has changed student expectations. These student expectations, described by Lansdell (2001), include increased levels of feedback, increased attention, and additional resources to help them learn (VanSickle, 2003). In response to meeting these expectations, alternative methods of instruction and class facilitation have evolved to support student cohesiveness and encourage learning. To successfully challenge the online student, increased communication is required between instructor and student (White, 2000).

Multiple methods for online instruction are utilized throughout academe. One method, described as the online learning community, has become preeminent in online instruction. Boettcher and Conrad (1999) define an online learning community as a community that "consists of learners who support and assist each other, make decisions synergistically, and communicate with peers on a variety of topics beyond those assigned" (p. 88). For this paper, the following is assumed of the online course:

- The course meets online during a regularly defined semester or quarter.
- The course is broken up into learning modules or content chunks.
- Student participation is required within a set time period – each content module is presented with a given start and end time.
- Learning takes place as students synthesize the prepared material and interact in class discussions with peers and the instructor(s).

Four stages are necessary for successful gardening and four stages are necessary for successful online teaching. A good gardener will prepare the soil for planting early; sow the seed; nurture the seedling to maturity, then harvest the crop reflecting on a productive season. A good online instructor will follow the same basic path: develop and structure the learning environment, introduce the material, encourage academic and intellectual growth, and finally, evaluate the effectiveness as he/she watches the students depart with an understanding and appreciation of the subject that will hopefully remain with them for a lifetime.

Preparing the Soil—Develop and Structure the Learning Environment

The first step in online instruction occurs long before the seeds are planted. As Brewer, DeJonge, and Stout (2001) suggest, it takes significant planning and preparation. The design of an online course "can either facilitate or impede the learning process" (p. 12). Much of this groundwork centers on designing the course syllabus. Preparation of the syllabus enriches the soil, providing a fertile and prepared environment for learning to occur.

Within the syllabus, student expectations should be clearly defined along well-written directions relating to course activities. Ko and Rossen (2004) relate the syllabus to a course contract and observe that new online instructors do not include enough information in their syllabi. These expectations should be stated in the opening orientation material as well as in the course syllabus. Preparation includes clear definitions of the following within the syllabus: contact methods, course objectives, attendance requirements, late work policies, the course schedule, orientation aids, grading scales and rubrics, communication practices, and technology policies.

Contact Information

The syllabus should include administrative items such as office times, contact information, and preferred modes of contacts. However, unlike a traditional course, instructors should be very clear about "online office hours" or hours of unavailability. For instance, if church attendance on Sunday mornings occurs regularly, it would be appropriate to inform the students in the syllabus of the offline time on Sunday mornings. Boettcher and Conrad (1999) suggest an online instructor not be available twenty-four hours a day to the student but establish a framework for turnaround response. This framework should offer recommendations for how long a student should expect to wait before repeating an email request that has gone unanswered. Jarmon (1999) also states that instructors should set expectations for the students regarding response time and let the students know how quickly to expect a response.

If there is a specific times when the instructor will be online, he/she should include a "fastback" time or online office hours. A fastback time is a time period when students can expect a quicker than normal email response, usually within the hour or soon after the message is received. Many instructors offer online office hours where they enter the class chat room and wait for questions. It is often reported by instructors that students underutilize this time, choosing to send email as their questions arise, rather than waiting until a prescribed time in the future.

An alternative to the using virtual office hour time for academic questions is to use the time for social conversation. A virtual social experience helps create a closer bond with instructor and classmates, furthering the strength of the learning community. This is a form of the "cyber sandbox" described by Palloff and Pratt (1999). The cyber sandbox is defined as a generic discussion or bulletin board area for students to just hang out and talk about movies or jobs or whatever their interests are. The creation of a social outlet not only helps to keep regular class discussion areas on topic, but Palloff and Pratt (1999) observed that "the sharing of our lives, including our travels, our observations, our emotions, and who we are as people is deliberately brought into the classroom in an effort to promote group cohesion and connection" (p. 78).

Course Objectives

Well-defined course objectives are an important element in any course syllabus. Clearly stated objectives are even more important in online courses as students do not have the opportunity to participate in the opening day syllabus discussions so common in many traditional courses (Jarmon, 1999). The communication of course objectives is also important because in an online course, much of the responsibility for learning is placed upon the student. Failure to properly inform the student of the course objectives leaves them feeling confused and puzzled about where each assignment, and moreover, the entire course is headed.

Attendance Requirements

Attendance requirements should be clearly stated, as attendance is necessary for courses that utilize online learning communities. Palloff and Pratt (2001) advise, "If clear guidelines are not presented, students can become confused and disorganized and the learning process will suffer" (p. 28). The online learning community requires students to take active roles in helping each other learn (Boettcher & Conrad, 1999). Students who do not participate not only cheat themselves but also those in their learning community.

Participation requirements must be defined for an online course. Ko and Rossen (2004) recognize "if students aren't graded, the majority won't actively participate" (p. 67). Some students think that if they take an online course, they can take a vacation and still catch up with their coursework upon their return or do a few modules ahead of time before they leave. While online courses do allow for flexibility, students must participate. If instructors want good participation, the participation requirements must be clearly defined. Students may ask if they can post ahead of the other students or take the course on a self-paced schedule. Because of the prevalence of this question, online instructors should have a policy regarding early posting and state it clearly in the syllabus.

Participation in online courses is inherently different from traditional courses. Students do not automatically understand how to participate in online courses. Course assignments and participation requirements should be defined in the syllabus and with each assignment. Where possible, assignments should be grouped into familiar categories such as class discussion, web searches, quizzes, reading assignments, etc. You may identify each type of assignment with icons. Creating a sample discussion or model may increase students' understanding of the participation requirement and how credit is assigned.

Late Work Policy

The instructor should create a policy for late assignment submissions and missed exams. Again, students who are not actively participating in the learning community are not assisting other students. Because of this interdependence, some instructors have a "no late work accepted policy," while others assign reduced credit. Another option is to create alternative assignments or exams for past due work or tests. To facilitate course management, these alternative assignments could be offered at the end of the course for those who missed assignments during the normal time period.

Course Schedule

One of the most important elements of an online course syllabus is the course schedule. The course schedule should list each module with beginning dates and due dates, assigned reading, assessment, and other activities. The course schedule becomes the map for the student and should be placed in the course syllabus, inside the course material, and redundantly throughout the course. In fact, Ko and Rossen (2004) recommend, "In an online environment, redundancy is often better than elegant succinctness" (p.76). If the website or course management system allows linking from the syllabus, then link each module of course content to the course schedule making it readily available to the student. Instructors should provide the course schedule in a printable format along with a digital format. Students should be encouraged to print out and follow their course schedules.

Along with the course schedule, each learning module should contain a checklist to facilitate management and completion by the student. This should be print ready so that students can print and read them offline. Course content that presents an easy to find and understandable assignment checklist will save numerous emails from students inquiring about due dates and making pleas for deadline extensions.

Orientation Aids

An orientation note or hints for success for the student should be written and available for the student (Jarmon, 1999). This may include hints for time management and good study practice. Frequently Asked Questions (FAQ) support self-help in answering questions (Jarmon, 1999). This allows the students to look for information before emailing the instructor. Over time, as questions are and answers are provided, a comprehensive FAQ will emerge. McCormack and Jones (1999) suggest the FAQ page can "reduce the number of questions at the start of the semester" (p. 2) and throughout the duration of the course. If a chat room is used for virtual office hours, relevant questions should be added to the course FAQ.

Grading Scales/Rubrics

Grading scales and rubrics should be defined for each assignment. If the courseware management system allows, each assignment could be linked to the rubric for clarity. When group assignments are utilized, instructors should use a grading rubric for the students to grade each other individually as well as the entire group. This motivates students to participate and provides for equity in grading of group work. It is also helpful if the instructor assigns groups or teams the first time. The class should get to know each other before group self-selection is allowed.

Communication Practices

An inbox consistently full of email will be overwhelming to any instructor. Therefore, it is important to include in the syllabus elements for class behavior, guidelines for posting to the discussion boards, email protocols, and digital file submission procedures. Establishing email protocols and other communication guidelines will assist the instructor in online classroom management. Many instructors require the course session number in the subject line so that the email related to the course can be filtered to a separate mailbox. Students may be asked or

required to use their institutional email address so that instructors are not confused by changes in address mid-term or are required to deal with bounced mail from full inboxes on students' free email accounts.

An instructor can create individual email sub-folders for each of the online students. Email that has been answered and or graded can be filed away, providing for a record of all course correspondence. Another tip for instructors is to read their mail backwards from newest received to oldest. In many cases, students have solved their problems so that the earlier questions become irrelevant.

Technology Policy

A technology policy should be stated in the syllabus that directs students to a helpdesk or resource other than the instructor for technology problems. Additionally, instructors should encourage students to create drafts of postings or assignments in a word processor and save them before posting to the discussion board. This will minimize spelling and grammar mistakes and provide a backup copy for the student in case of a technical problem. Students should be d to save all of their work on a computer hard drive and also to a removable device, such as a floppy disk or USB flash drive. Saving their work to a USB drive allows the student portability between home, office, and campus systems, and a chance of recovery if their systems go down. They can then take their files with them, use them on the computer of a family member or friend, or any publicly accessible computer in an office, library, or cybercafé.

Sow the Seed – Opening the course

The second step for successful online teaching is opening the course and the initiation of instruction. An enthusiastic and engaging opening week of class is a great way to start the course. This time of seed germination is a fragile period; disruptions or unnecessary interferences may set a tone that stifles learning during the remainder of the course. It is important to create an initial impression that will stimulate development of the learning community and nurture the students to maturity. Open the course by sending a welcoming email and announcement, initiating class-wide introductions, encouraging students to read the syllabus, and establishing a tone of excellence.

Welcome Email and Announcement

Moore, Winograd and Lange (2001) offer several tips for the first session of class: send a welcome email that invites the students to join the class, telephone students who don't appear in the classroom the first week, and duplicate your welcome email in a class announcement if the course management system allows. The announcement should encourage students to check their email regularly. The first week should have fewer assignments to allow students to post introductions and get to know each other. Technical issues should be dealt with immediately; provide information on helpdesk support if available.

Introductions

The instructor should spend time getting to know the students individually the first week of class and encourage the students to do the same. An introductory discussion inviting the participants to introduce themselves and to share something in particular with the group is a successful strategy for building the learning community. The instructor should participate heavily in this discussion (being careful not to dominate it) and should respond to one or two things in the introductory posting of each student. Ko and Rossen (2004) suggest the "initial postings in the discussion forum, your first messages sent to all by email or listserv, or the greeting you post on your course home page will do much to set the tone and expectations for your course. These 'first words' can also provide models of online communication for your students" (p. 189).

Offering an icebreaker in the first session, such as "share your silliest moment in college" or "name the animal you most identify with," helps to alleviate the nervousness and provide insights to the personalities of fellow students. Several good icebreakers that also provide an instructor with a basic student learning inventory include the VARK learning styles (http://www.vark-learn.com/english/index.asp) and the Keirsey temperament sorter (http://www.keirsey.com). The Kingdomality profiler (http://www.kingdomality.com) provides not only a Medieval vocational assessment but also is fun and generates discussion possibilities. Each of these websites offers instant results, and the students can post their results and a short paragraph if they agree or disagree. Countless other sites allow students to discover their commonalities and similarities as well and can be found with a simple Internet search.

Emphasize the Syllabus

A great hint for the first session of class is to create a syllabus quiz or scavenger hunt that "teaches students how to navigate your course" (Schweizer, 1999, p. 11). Then, offering bonus points to assess syllabus comprehension is a successful way of engaging the student in the first session of class. Encouraging students to review the syllabus in a more thorough process can alleviate confusion later in the course as they familiarize themselves with the course requirements.

Establish a Tone of Excellence

The first several weeks also set the tone for academic participation. Instructors should grade discussions/assignments stringently in the first few assignment cycles. Establish a tone of excellence early and encourage students to do their best. "Students want to receive timely and personal feedback" (Boettcher & Conrad, 1999, p. 97) early in an online course. They may not be able to assess their progress as easily online as they would in a traditional course (Boaz, 1999). It is also helpful to remind the students of these expectations throughout the course. It is always easier to lessen the workload later than to increase it.

Nurture the Growth – Nurturing the Learning Community

The third step of teaching online is to nurture the learning community. The learning community must be established and then become self-sufficient. The learning community, like a garden, must be cultivated. This cultivation occurs when an instructor provides ample communication, facilitates the discussion board, treats each student as an individual, adds emotion and belonging, responds quickly to questions, models required behavior, creates appropriately sized groups, and clearly outlines expectations for group activities.

Provide Ample Communication

Online students are eager for communication. Lack of instructor-student communication early on will create a negative learning community thus disabling the learning process. Instructors should use class-wide announcements, group emails, and chat archives to facilitate accessible, public communication in the online course. As the course grows, students should be encouraged to facilitate the discussion and assume some of the roles previously controlled by the instructor.

Communication must be both reflective and proactive. Many courses use class-wide journals or summaries to bring closure to modules. Sending out class-wide summation/introduction/transitional emails at the end of each module, wrapping up the previous content, and introducing the next module provide for a sense of transition. Reminding the students of requirements for the current module, such as projects or exam dates, is very helpful to the students. It takes about ten minutes a week for either of these tasks, yet the benefit provided is far more valuable. Proactive communication yields fewer questions, saving dozens of hours answering the questions individually.

Instructors should keep their interaction with the class as open as possible. Using the "Course Announcement" area frequently for reminders and duplicate important information in emails will increase open communication. It is also important to communicate to the class each time grades are posted. This creates a "don't call me, I'll call you" communication pattern for grade information. Within that communication, remind students to contact the instructor if a grade is missing. This puts the responsibility back with the student for finding and submitting any missing work.

Facilitate the Discussion Board

Bischoff (2000) suggests, "The key to online education's effectiveness lies in large part with the facilitator" (p. 58). Likewise, for the threaded discussion to be successful, the instructor should become a facilitator and review the discussions without controlling them. Many online instructors have found what many gardeners realize: at times, hands-on action produces results but in many cases, too much activity can be as harmful as none at all. This particular role of the facilitator in the online classroom can be difficult for a traditional instructor to accept. A traditional instructor may be accustomed to dominating or controlling the discussion through lecture, but in an online class, all students have equal opportunity to participate in the discussion and often do outside of the instructor's influence. It takes a good deal of time for some traditional faculty to feel truly comfortable in allowing the discussion to take place outside the classroom and without their intervention, but that is fine—experience will eventually guide them.

For good discussion board facilitation, the instructor should randomly and selectively reply to students and provide prompt explanations or further comments regarding the topic of discussion. The instructor or facilitator should provide feedback in the discussion even if it is merely a "cheerleading" comment, redirection, or guideline submission. The instructor should intervene when the discussion seems to be struggling or headed the wrong way (Palloff & Pratt, 2001) but should not over-participate in the discussion, as this will be considered stifling and restrictive. Some instructors prompt absentee or "lurker" students with a gentle reminder email or a telephone call. According to Bischoff, (2000), "A phone call may prove more timely and effective" (p. 70) in helping a student engage in the discussion.

Many instructors assign assistant facilitators and summarizers for each discussion session, providing opportunities for different kinds of student involvement. Other instructors use "coaching teams" made up of students or tutors as the first line of support, then invite the students to ask the instructor for clarification or further assistance. Good facilitation of online goes beyond content. Under favorable circumstances, the "discussion will end in acceptance of different opinions, respect for well-supported beliefs, and improved problem-solving skills" (Brewer, DeJonge, & Stout, 2001, p. 109)

Treat Each Student as an Individual

Instructors should value individual contributions and "treat their students as unique" (White, 2000, p.11). A simple technique is to use the students' preferred names or nicknames in all correspondence. It is also important to add positive emotion and visual cues. The online environment can be limiting when the communication is mostly text-based. Emoticons serve the same purpose as nodding a head in agreement or offering a welcoming smile as would occur in a traditional course.

Add Emotion and Belonging

When online learning is facilitated incorrectly, students can feel isolated and cheated of a valuable learning experience. This could lead to feelings of separation and disappointment that negatively impact learning. White (2000) advises that "a positive emotional climate can serve as a frame of reference for online students activities and will therefore shape individual expectancies,

attitudes, feelings, and behaviors throughout a program" (p. 7). Since there are no visual clues in the online classroom, one suggestion for communication is to type out the emotion expressed in parentheses (*smile*) or to include emoticons, such as **:-)** for happiness or **:-0** for surprise or dismay. It is also possible to describe you body language in the email. Salmon (2002) offers this example: "When I read your message, I jumped for joy" (p. 150). This descriptive effort shows the students the instructor's personality and positively stimulates the online community. It is also beneficial, as Hiss (2000) suggests, for online instructors to keep their sense of humor.

Respond Quickly

Time delays in a threaded discussion can be frustrating for students. This is especially true if the response was misunderstood and the students have attempted to clarify. Online instructors should try to post daily or on a regular schedule that has been communicated the students. Some instructors create homework discussion threads for content support, which provides a forum for students to help each other.

Model Behavior

Instructors who engage students in collaborative groups should facilitate development of social skills. This begins at the onset of the course when the learning community is formed and students recognize the online classroom as a safe place to interact. Group skills should be modeled by the instructor and outlined in the course syllabus. For example, if a two paragraph introduction is expected, the instructor should model that in their own introduction to the class in the opening discussion.

Create Appropriately Sized Groups

Most students enjoy the online social interaction and find that it encourages their learning experience. Independently minded students find that the asynchronous nature of the course enables them to participate more readily than in the face-to-face classroom. In creating groups, Ko and Rossen (2004) recommend that instructors divide students into groups instead of allowing students to pick their own groups. Students may find it difficult to meet online and form groups quickly. Many instructors search the introductory material to find common elements among students to hasten the group cohesion.

Groups should not be too large or too small. The most effective group size appears to be four students per group. Utilizing these suggestions, the group work should begin early to promote a positive learning experience in the online classroom. The actual process for completing the project should be outlined by the instructor, but the final outcome should be the group's responsibility.

Harvest—Plan For the Next Semester

The final stage of online instruction is assessment. It is a rewarding experience to watch learning take place in the minds of students. It is why many instructors choose relatively low pay for teaching compared to lucrative jobs in the for-profit world. Just like gardeners in autumn, assessment is a time of reflection and satisfaction for a job well done. Tiny seeds sown early in the season are actively growing and producing. At this stage, instructors should evaluate each student's performance against course objectives. What worked well and what needs to be improved for next season? This can be accomplished by keeping a journal and by soliciting feedback on instruction and course content.

Keep a Journal

Self-examination and contemplative thought are successful approaches for course improvement. A recommended practice is to keep a journal that records items that should be redesigned or

altered the next time the course is taught. The instructor should make notes of assignments that worked well and those that struggled, and critically evaluate the effectiveness of content and instruction.

Solicit Feedback on Instruction

Student feedback improves the instructor's teaching. A good place to gather the feedback is inside the course management system. It is helpful to survey for student feedback during the course, not just at the end with course evaluations. The instructor can develop a discussion thread for students to post feedback anonymously about the course, including possible suggestions for improvement. If a student does offer feedback, the instructor should acknowledge the feedback and be appreciative for the remarks.

Feedback instruments should provide the students with a way to communicate what they like the best and the least about the instruction of the course. If possible, mid-course changes in responses to students' comments will allow students to feel empowered through taking an active role in their education.

Solicit Feedback on Course Content

All online instructors should look for possible course revisions. Course content should never stay static. Moore, Winograd, and Lange (2001) propose that "because online course design and teaching are so new, evaluating the effectiveness of your course and then refining it based on the results of that evaluation become imperative" (p. 12.3). If using end-of-course summary feedback, the instructor must receive this feedback in time to reevaluate the course for the next semester and add suggested changes, if necessary. Another possibility is an end-of-session discussion regarding the focus of the next session, thus allowing for minor course revisions even as the course continues to be taught.

Conclusion

Online teaching has brought a new modality to distance education. It has also brought frustration and anxiety to the instructors attempting this new methodology. Moore, Winograd, and Lange (2001) remark "One faculty member who had only just finished her course online said it was like diving into a great chasm, blindfolded" (p. 11.3). Instructors who are comfortable with the traditional methods for teaching in the classroom struggle to engage students over the Internet. While many of the same techniques apply, teaching online requires additional techniques for success. These techniques are similar to the same steps a gardener takes to develop a garden. In the online classroom, the ground is prepared with a carefully designed syllabus and policies, the seed is planted in the first session of class, and the learning community is nurtured to grow and become self-sufficient. These steps yield students who are engaged and working toward completion of the learning objectives. By utilizing these strategies for teaching online effectively, an instructor will engage the online learner, nurture a successful learning community, and alleviate the frustration and fear that goes along with teaching online.

References

Bischoff, B. (2000). The elements of effective online teaching. In K. W. White & B. H. Weight (Eds.), *The online teaching guide* (pp. 57-72). Needham Heights, MA: Allyn and Bacon.

Boaz, M. (1999). Effective methods of communication and student collaboration. In *Teaching at a distance: A handbook for instructors* (pp. 41-48). Mission Viejo, CA: League for Innovation in the Community College.

Boettcher, J. V., & Conrad, R. M. (1999). *Faculty guide for moving teaching and learning to the web*. Mission Viejo, CA: League for Innovation in the Community College.

Brewer, E., DeJonge, J., & Stout, V. (2001). *Moving to online: Making the transition from traditional instruction and communication strategies*. Thousand Oaks, CA: Corwin Press, Inc.

Hiss, A. (2000). Talking the talk: Humor and other forms of online communication. In K. W. White & B. H. Weight (Eds.), *The online teaching guide* (pp. 24-36). Needham Heights, MA: Allyn and Bacon.

Jarmon, C. (1999). Strategies for developing effective distance learning experience. In *Teaching at a distance: A handbook for instructors* (pp. 1-14). Mission Viejo, CA: League for Innovation in the Community College.

Ko, S., & Rossen, S. (2004). *Teaching online: A practical guide*. 2nd ed. Boston: Houghton Mifflin.

McCormack, C., & Jones, D. (1998). *Building a web-based education system*. New York: John Wiley & Sons, Inc.

Moore, G., Winograd, K., & Lange, D. (2001). *You can teach online*. New York: McGraw-Hill Higher Education.

Palloff, R. M., & Pratt, K. (1999). *Building learning communities in cyberspace: Effective strategies for the classroom*. San Francisco: Jossey-Bass.

Palloff, R., M., & Pratt, K. (2001). *Lessons from the cyberspace classroom: The realities of online teaching*. San Francisco: Jossey-Bass.

Salmon, G. (2002). *Developing e-tivities*: *The key to active online learning*. London: Kogan Page Ltd.

Schweizer, H. (1999). *Designing and teaching an on-line course: Spinning your web classroom*. Upper Saddle River, NJ: Prentice Hall.

VanSickle, Jennifer. (2003). *Making the transition to teaching online: Strategies and methods for the first-time, online instructor*. Morehead, KY: Morehead State University. (ERIC Document Reproduction Service No. ED479882)

White, K. (2000). Face to face in the online classroom. In K. W. White & B. H. Weight (Eds.), *The online teaching guide* (pp. 1-12). Needham Heights, MA: Allyn and Bacon.

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Editor's Note: Online editor Brent Muirhead has the final statement on ways to make online learning into a rich learning environment through community building activities, shared responsibility, and vibrant interaction.

Contemporary Online Education Challenges

Brent Muirhead

Introduction

My discussion will note some of the educational concerns about the quality of today's online degree programs. Relevant instructional advice will be given on how to enhance the teaching and learning process.

Distance Education Dialog Challenges

The online setting holds potential for vibrant interaction and rich dialog. Unfortunately, online educational experiences can become quite wooden and lifeless at times, like a boring traditional classroom. Distance educators and their students can become disillusioned with the teaching and learning process when it lacks a dynamic interactive character. The author believes that part of the problem involves having a rigid learning environment that fails to acknowledge that learning must be context sensitive. Scott Gray (1999, paragraph 7) offers insights into the nature of online interactions:

> *Good – even great – online teaching will not be –will never be built- because you can not build interaction. You enter into it, like a warm bath (shades of McLuhan) like a familiar suit, like a comfortable home. The online materials are only the tools and components of online instruction hammers and screwdrivers and saws and doorframes and kitchen cupboards and furnaces and wall-to-wall carpeting. They do not – cannot- constitute a home. The pausing, the pacing, the pushing, the pulling, the selection, maybe of this movie, that online resource project, such-and –such project – all of these occur in a dynamic fashion in the classroom, and indeed even to a large degree in online learning. Great teaching adapts and flows. The more personalized, the more context-sensitive such adaptations become, the more full the educational experience becomes, the more like a home, the less like a pile of tools.*

Gray's (1999) comments reflect a keen awareness of the importance of having an educational model that provides adequate flexibility for instructors and students to freely interact. Today's students want online classes that are enjoyable places where learning expectations are built upon relevant intellectual activities and discussions. It is interesting to observe teachers who claim to be student-centered in their educational philosophy but actually are quite controlling in their classes. Teachers can dominate online dialogs by posting an excessive number of messages that highlights the instructor's knowledge expertise but undermines the communication process. Instructors can become threatened by the online setting which has an open ended quality which causes some individuals to strive for security through greater control. Sadly, students are receiving a less academically rigorous education because they are not challenged to be independent thinkers. Students wonder about the quality of their ideas because the teacher fails to create a legitimate dialog that affirms the worth of their questions and concerns.

Making Positive Online Learning Connections

Meyer (2002) encourages teachers to take responsibility for properly using technology as a communication tool in their classes. Teachers should create email notes and biographical narratives that highlight their personalities. These are simple ways to integrate the teacher's social presence into their classes which stimulates interactivity. Teachers can design biographies that offer informative background comments relating to their academic degrees, professional experiences, personal interests and hobbies. Biographies should be designed to establish the professional credibility of the instructor and affirm the personal dimension of their lives. Instructors can enrich their biographies by using graphics, a personal picture and favorite quotes. It is a useful way to help students become acquainted with their teachers. Also, students appreciate having teachers who utilize a university or personal website. The University of Phoenix provides instructors with individual faculty websites that are designed to share basic contact information and biographical data. Students can access their instructor's website prior to the start of their course which helps them feel more comfortable about taking the class.

Collison, Elbaum, Haavind & Tinker (2000, p. 49) shares eight facilitator tasks that encourage relevant online work and interaction:

- Leading introductory, community-building activities
- Providing virtual 'hand holding' to the digitally challenged
- Acknowledging the diversity of participants' backgrounds and interests
- Infusing personality with tone, graphics and humor
- Maintaining a nurturing pace of responding
- Keeping up with a pace set
- Organizing posts and discussion threads
- Balancing private email and public discussion.

The eight tasks reveal the need for instructors to take a comprehensive view of interaction by making it a major objective within their curriculum plans. Students want intellectually and emotionally engaging dialogs which have connections to their current and future jobs. Integrating cognitive and metacognitive activities into the online setting remains a challenge for today's instructors who must deal with issues of student readiness and institutional barriers (i.e. course structure). Peters (1998) believes distance education is often delivered within the context of an industrial organizational paradigm. He voices concerns that distance education institutions use tightly structured courses with lectures and instructional activities that foster passive students learning patterns. "Students should not be the objects but the subjects of the teaching process" (Peters, 1998, p. 98).

Peters (1998) proposes an educational model that is quite similar to Rogers (1969) which places emphasis on having a self-directed, autonomous and informal learning approach. Students are expected take a leading role in their own education and learn to refine their metacognition skills. Garrison (2003, 1997) offers a sophisticated paradigm that classifies self-directed learning into three categories: self-management, self-monitoring, and motivation. The three elements acknowledge the importance of recognizing the need for students to become less dependent upon their instructors to acquire skills and knowledge. Teachers must offer appropriate guidance and a class structure that gives student instructional activities that encourage personal responsibility and accountability for meeting course learning objectives.

Today's distance teachers often advocate a self-directed learning philosophy because it encourages personal and professional growth. The concept of self-directed learning is vital to creating an educational setting or environment that promotes critical thinking. Moore (1993) advocates learner autonomy in distance education that involves a combination of instructional structure and dialogue. Knowles (1990, p. 135) relates that learners demonstrate self-directed learning skills by:

- Diagnosing their own needs for learning
- Formulating their own learning objectives
- Identifying effective human and material resources for accomplishing their objectives
- Choosing and implementing effective strategies for using these resources
- Evaluating the extent to which they have accomplished their objectives.

The level of cognitive maturity will vary among students which will require having teachers to make creative adaptations to their teaching plans and activities (Bullen, 1998). Curriculum changes should not reduce the academic quality of the course work. Online degree program administrators must avoid the temptation to dumb down their curriculum standards to increase their student enrollment numbers. The lowering of educational standards appears to help more students experience a measure of academic success. It really represents a patronizing view of people that questions their ability to effectively take on new intellectual challenges and it reflects an ambiguous view of equity. Furedi (2004) relates "… by treating people as weak and vulnerable individuals who are likely to stumble when confronted by intellectual challenge, such cultural attitudes serve to create a culture of low expectations" (p. 138). Distance education administrators, admission personnel and teachers need to work together to maintain high intellectual expectations for their students and uphold the academic integrity of their institutions.

Distance educators must develop short and long term goals for their students that recognize changing individual learning habits takes time, patience and a willingness to practice. Instructors can assist students through class activities which offer clear insights into their thinking processes. Writing assignments can be an excellent opportunity for students to practice being self-directed and reflective. Students should learn how to effectively select a topic and conduct research on it. The author has graduate online students learn about critical thinking by using this topic as the focus of one of their Power Point presentations. The initial student reaction to this assignment is somewhat apprehensive about teaching something as complex as this topic. The author shares lectures and charts on critical thinking principles which help alleviate their anxiety.

Students are required to develop either a handout, pamphlet or outline notes on their Power Point presentation. Student comments after their presentations indicate that reflective thinking is less of a mystical concept to them and it is more practical than they had realized. Online teachers who want to offer practical advice to encourage more intentional critical thinking in their students should consider sharing the following nine strategies (Paul & Elder, 2000)

- Use 'wasted' time
- A problem a day
- Internalize intellectual standards
- Keep an intellectual journal
- Reshape your character
- Deal with your ego

- Redefine the way you see things
- Get in touch with your emotions
- Analyze group influences on your life (p. 40).

Conclusion

This brief discussion has highlighted some of the academic challenges that face distance educators. "Today's manipulative attitude towards standards is in part a product of disappointment with the experience of reform in education, culture and social policy" (Furedi, 2004, p. 17). Online education is not immune from negative social trends which can undermine the teaching and learning process. Contemporary instructors play a vital role in shaping the intellectual depth of their online communities by helping their students become reflective and self-directed learners.

References

Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education*. 13 (2).Available: http://cade.icaap.org/vol13.2/bullen.html

Collison, G., Elbaum, Haavind, S., & Tinker, R. (2000). *Facilitating online learning. Effective strategies for moderators.* Madison, WI: Atwood Publishing.

Furedi, F. (2004). *Where have all the intellectuals gone? Confronting 21st century philistinism.* New York, NY: Continuum.

Garrison, D. R. (2003). Self-directed learning and distance education. In M. G. Moore & W. G. Anderson (Eds.). *Handbook of distance education*, pp. 161-168. Mahwah, NJ: Lawrence Erlbaum Associates.

Garrrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly*, 48 (1), 15-31.

Gray, S. (1999). Message. ListServ WWW Courseware Development. Retrieved October 16, 2004 from http://listserv.unb.ca/bin/wa?A2=ind9907&L=wwwdev&T=0&F=&S=&P=2146

Knowles, M. S. (1990). Fostering competence in self-directed learning, In R. S. Smith (Ed.) *Learning to learn across the life span.* San Francisco, CA: Jossey-Bass.

Meyer, K. A. (2002). *Quality in distance education: Focus on on-line learning*. San Francisco, CA: Jossey-Bass.

Paul, R. & Elder, L. (2000). Critical thinking: Nine strategies for everyday life, Part I. *Journal of Developmental Education*, 24 (1), 40. Retrieved from the University from Phoenix Online Library and ProQuest Database October 15, 2004.

Peters, O. (1998). *Learning and teaching in distance education: Analyses and interpretations from an international perspective.* London, England: Kogan Press.

Rogers, C. (1969) *Freedom to learn.* Columbus, OH: Charles E. Merrill.

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