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## ***Trends in Online Education: Case Study at Southwest Missouri State University***

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# Trends in Online Education: Case Study at Southwest Missouri State University

By Dr. Lesta A. Burgess and Dr. Shawn D. Strong

## Introduction

The World WideWeb (WWW) continues to be an exciting medium for the development of classroom activities. The Internet and associated WWW resources found their way into the realm of education due to unique features that create tremendous possibilities for delivery of instruction. The exact role the Web will have in tomorrow's classrooms and virtual classrooms has yet to be clearly defined. This paper will explore the state of online education, its criticisms and praises, as well as its potential in the industrial technology discipline.

## Online Education Delivery

The Internet is primarily a delivery vehicle for information and a communication system with significant potential for facilitating the teaching/learning process (Wells, 2001). The Internet offers many different ways to deliver instruction and provide resources. The Web supports the delivery and use of multimedia elements, such as sound, video and interactive hypermedia (McNeil, Robin & Miller, 2000). The Internet is changing how education is conducted by the way instruction is delivered.

Online instruction can offer new challenges and opportunities to both students and instructors (Cooper, 2001). Curriculum, administration, and assessment are all being influenced and that influence is growing (Austin & Mahlman, 2000). Online classes meet the needs of working adults and students who have computer experience. These needs include flexible work schedules as well as special interests.

Web-based learning generally fits into one of three major categories:

- Self-paced independent study:  
You set the schedule and study at

your own pace. You can review the material for as long as you need to. Feedback from online quizzes takes the form of preprogrammed responses. There is no one to whom you can direct questions. This form of study requires the most self-motivation.

- Asynchronous interactive: You participate with an instructor and other students, although not at the same time. You attend classes whenever you like for as long as you like. This approach offers support and feedback from your instructor and classmates. It's usually not as self-paced as independent study.
- Synchronous learning: You attend live lectures via computer and ask questions by e-mail or in real-time live chat. This format is the most interactive of the three and feels the most like a real classroom. Flexibility is more limited because of the set lecture schedule. There are limited course offerings in this format due to high delivery costs (Ryan, 2001).

Each online class must be a reliable and robust teacher-present environment that is, in effect, always in session throughout the term. Each class must have its own Web page that might include both static and dynamic items, such as: a welcome message, an overview by the professor, how to get started, course textbooks, instruction methods including the modes of interaction, lecture notes, tutorials and demonstrations, an annotated bibliography, a weekly schedule including assignments and readings, instructions on how to submit assignments, special weekly or daily announcements, a class

list with student biographies, weekly solutions, sample student projects, links to Internet resources, grading criteria, and how to contact the professor, the program office, and computer support personnel. The Web page should also provide buttons that transport the student to tools such as threaded discussion boards, chat rooms, an electronic library, an online assignment submission system, canned lectures, a CD-ROM, online exams, and a record of the student's grades (Lieblein, 2000).

One of many differences between traditional classroom courses and distance delivery is personal, physical interaction, not only with the instructor, but also with fellow classmates (Schmidt & Gallegos, 2001). Interactivity in web based learning is the topic that receives the bulk of both criticisms and acclamations.

### ***Criticisms and Strengths of Online Education***

Like any other educational delivery method, educators have opinions regarding the merits of online education.

#### ***Criticisms***

- Stifles academic freedoms and intellectual property rights
- Advocates quantity not quality
- Increased preparation and delivery time

#### ***Strengths***

- Requires student engagement
- Eliminates geographical constraints
- Multiple learning styles can be easily served
- Documents course content
- Students must take a greater responsibility for their education

Online education may be in its infancy, but already some academics are giving it a failing grade. Many academics fear that turning college courses into prepackaged content for sale over the Internet compromises the spirit of free inquiry on which most academic institutions were founded. Some professors protest that marketing and selling course for a profit reduces education to a commodity, impinging on their academic freedom and intellectual-property rights (Cleary, 2001).

Critics not only complain about the particulars of e-learning, such as e-mails that force professors to spend more time on fewer students, they also caution that e-learning threatens to undermine higher education. The charge that episodic, in-and-out, commercialized, superficial learning provided by diploma mills, corporate universities, software vendors and product makers may increasingly supplant traditional universities and become a substitute for a well-balanced education (Rosenbaum, 2001).

As for course load, initial preparation usually involves more work than that required for an on-campus course. There is also a timing issue – online usually requires completion of most, if not all, of the preparations prior to the start of the term. Independent of preparation, conducting an online class will take more work than conducting an on-campus class (Lieblein, 2000).

The challenge for learners to succeed in online learning presents a dramatic shift from their traditional perspective about campus-based classes to how they approach their roles, responsibilities, and attitudes in an online class, as well as their expectations about the online environment. Learners know from experience that campus-based courses are highly organized and structured by the professor. Usually they look to their professors to automatically deliver the lecture, plan the lab exercise, and facilitate class group activity. How such activities work in the online environment is not inherently clear to learners who are new to taking online courses (Dringus, 2000).

### ***Strengths of Online Education***

Proponents argue that online courses actually are better than traditional instruction at discouraging student passivity and encouraging lifelong learning. Particularly in an interactive, multimedia environment, students often find greater opportunities to learn by working through new concepts. Even with relatively low-tech presentations online, they enjoy the freedom to proceed slowly or click past material they already know. Ideally, e-learning

also promotes group learning and inquiry via serial e-mails known as “discussion threads” (Rosenbaum, 2001).

According to Cooper (2001), when asked to comment on the advantages of online classes or the “most helpful features of online instruction,” over 80% of the students stated that online classes enabled them to better manage work and school, and they liked being able to learn at a self-directed pace. Cooper (2001) further stated, “many students commented that online instruction enabled them to be personally responsible for their own learning and determine for themselves the amount of time they needed to achieve expected outcomes and meet course requirements.” Not having to spend time commuting, finding babysitters, or actually sitting in class were other significant advantages noted by a number of online students who described themselves as full-time employees or stay-at-home mothers who wanted a college degree but found it difficult to attend classes at a fixed time (Cooper, 2001).

### ***Keys to Successful Online Implementation***

Instructor preparation, course development, instructor accessibility, and course monitoring are all critical elements of effective online courses. Also, technology glitches must be kept to a minimum, to avoid learner frustration. Instructors must devote more time, including late evenings and weekends, to interacting with students. Responding to individual e-mails or posting to a discussion board is more time consuming than clarifying a point to everyone in a traditional classroom (McEwen, 2001).

With the right subject matter, with the right instructor or facilitator, and for the right student, Internet or online classes can provide an effective educational environment and offer a viable alternative to traditional classroom instruction (Cooper, 2001). As the distance delivery system matures and continues to serve an increasing number of learners, industrial technology faculty members need to prepare for teaching courses utilizing the distance learning technology (Smallwood & Zargari, 2000).

## Case Study

Southwest Missouri State University's (SMSU) Department of Industrial Management, like many other institutions, is making an attempt to enter the increasingly competitive realm of online education. With an online 2+2 completion program and an online masters program they are attempting to carve a niche with working manufacturing employees looking for educational advancement.

SMSU's findings have been similar to those mentioned previously. An effective educational environment results from the right combination of subject matter, instructor, and student.

### *The strengths of SMSU's program are:*

- Expanded accessibility to a more diverse student population
- Access to many online resources
- Standardizes and documents topics covered in courses
- Requires engagement of all students

### *The weaknesses of SMSU's program are:*

- Traditional undergraduate students enroll in online courses
- Deliverability of lab oriented content online
- Significant time required to adequately deliver online content

Two clearly different student populations take online courses offered by the Department of Industrial Management. In online undergraduate courses on-campus students make up approximately half of the population. In the Department of Industrial Management, courses are offered one semester in a live format and in the online format the other semester and therefore do not directly compete with one another. The on-campus student is discouraged from taking online courses through an elevated tuition structure but many are still attracted to the flexibility online courses allow. This same flexibility may be what leads unprepared students to failure due to incomplete or insufficient work. The other half of the population is a diverse group of non-traditional working students. At the undergraduate level these students are primarily from the southwest Missouri region. At the

graduate level, students have no apparent geographical commonality. Non-traditional students in general thrive in the self-paced realm of online education.

More important than the location of the student is the clarity of instructor expectations. Traditional, on-campus students tend to do exactly what the instructor may ask without asking for clarifications while the non-traditional student will ask for clarifications. The result is one student performing the assignment as it was written, and the other student completing the assignment as the instructor "really" wanted it. Is the on-campus student really wrong for completing what was asked? The burden of student success is on the faculty to be clear in their expectation.

Subject matter is not as critical as the supporting information used to deliver the content. Faculty at SMSU no longer simply look at the text itself when making a textbook selection. An available Blackboard or WebCT plug in, PowerPoint slides, digital test question banks, and up-to-date case studies, are considered in conjunction with the textbook itself. Because of the time required to develop an online course, faculty increasingly look for a course package. SMSU faculty have found in general, author developed course packages are more complete, and contain more accurate information than self developed content. A perfect text to course match is not always possible due to the diversity of many industrial technology courses. Online courses allow a professor to bring together diverse resources in a single location. Upkeep of such a course is time consuming with links continually changing and the legality of wholesale downloading of content to a local server is much like photocopying an entire text. Often times it is easier to develop new content than to rely on content that may not be available later in the semester. While time consuming, a distinct strength of online education for technical content is the compatibility to change.

The issue of course ownership has been a topic of recent discussion at SMSU. The university pays a stipend of \$3,500 for online course develop-

ment. Because of this, the university is entitled to the course material should the faculty leave. Faculty also receive a stipend each time they teach their online course. Before a course can be reassigned to another faculty member the course developer is given right of first refusal. Faculty may have to teach the course as overload making the option less attractive. The extra salary allowed for teaching online is a positive attribute, though reassignment of the course to another faculty becomes difficult and possibly controversial.

Mobility of a course between faculty is quite possible. The perception that strong faculty are not required for the delivery of web-based course content or faculty can be replaced by online courses has not proven true at SMSU. Live and online course evaluations have been correlated. Those faculty members who perform well in front of a live class tend to do well online. Organization and preparedness are two traits critical for both the live and online instructor. The online student actually requires as much interaction as a student in a live setting. The type of interaction that occurs online is different but very meaningful, as more thought is put into the written word than the spoken word.

Reading and writing performed in an online course caters best to a visual learning style. Auditory or kinesthetic learners are somewhat neglected, not because of the capabilities of the technology, but due to the time required to develop recorded lectures or anything beyond visual resources. However, the ability to move around or be comfortable in their surroundings may benefit tactile\kinesthetic learner or a student with attention deficits. Regardless of the learning style, the engagement necessitated by online delivery often times compensates for this shortfall.

While many on-campus students take an online course because of the flexibility it allows, most comment the online course was the hardest course they took during the given semester. Online courses take more time and self-motivation than an equivalent live course. Most students have become accustomed to the live format through

years of education and find adjusting to an online course difficult. Online courses at SMSU require substantial contributions to asynchronous discussions in addition to weekly assignments. Attrition of 20% is not uncommon during the first week of any online course at SMSU. However, those students who continue through the class say they enjoy the flexibility and style of the online courses and typically work toward an online degree.

### **Recommendations**

Ever-changing technology will enhance the potential of online delivery for the foreseeable future. Increasing data transfer speeds will allow for delivery of higher quality video and audio, real time interaction with multiple students, and the exchange of large data files. Book publishers will continue enhance online delivery with course cartridges consisting of power point presentations, digital test banks, and recent case studies. With each iteration of an online course, faculty will build course content, access to outside material, and as course prep time decreases interaction with students will increase.

The diverse nature of Industrial Technology results in courses where several topics may be taught in one course that is approached as separate courses in other disciplines. Finding suitable text for such courses either means developing supplementary content or compromising on text books selection. Publishers such as Prentice Hall and others have begun to offer “pick and choose” texts that allow faculty to select the content for text book inclusion. Using online resources faculty should build formal consortiums that allow authors to use and build upon each others electronic course material. This approach to course development would enhance online delivery, reduce online course development time, allow author feedback, and possibly further the Industrial Technology discipline.

The ongoing debate of the merits of online versus live delivery is not likely

to ever disappear; therefore, efforts should focus on the improvement of the online media. Meaningful analysis of online delivery methods and techniques are necessary before online delivery fully matures. The delivery of technical content online is an area the Industrial Technology discipline should lead. The utilization of industrial simulations, supervisor control and data acquisition (SCADA) techniques for remote control of the manufacturing environment, and remote software usage are a few of the topics that could provide ample fodder for applied research and application in the classroom.

### **Conclusion**

Online education has the potential to further Industrial Technology through collaborative curriculum development. The delivery of technical content using a wholly online format, while not a new concept, is rarely done and presents multiple opportunities for applied research.

With Web based instruction in its infancy we will not know the full effect of the Internet on education for years to come. We do know Web based instruction has its strengths and weaknesses. Much like the traditional classroom, given the right subject matter, instructor\delivery method, and student the online experience can be very rewarding. Just like the traditional classroom, given the wrong subject matter, instructor\delivery method, and student the educational experience can be very poor. Regardless, it is still up to the faculty member to make the classroom experience, wherever it is, a learning environment rather than purely a teaching environment.

### **References**

Austin, J.T. and Mahlman, R. A. (2000). Using the Internet for career-technical assessment: A pilot project in Ohio. *Journal of Career and Technical Education*, 16 (2), found May 15, 2002 <http://scholar.lib.vt.edu/ejournals/JCTE/v16n2/austin.html>.

- Cleary, S. (2001). E-commerce (a special report): The classroom—the downside: Why some critics give web-based education less than stellar grades. *Wall Street Journal*, Eastern Edition, p. R32.
- Cooper, L. W. (2001). A comparison of online and traditional computer applications classes. *The Journal*, 28 (8), p. 52-58.
- Dringus, L. P. (2000). Towards active online learning: A dramatic shift in perspective for learners. *The Internet and Higher Education*, 2 (4), p. 189-195.
- Lieblein, E. (2000). Critical factors for successful delivery of online programs. *Internet and Higher Education*, 3 (3), p. 161-174.
- McEwen, B. C. (2001). Web-assisted and online learning. *Business Communications Quarterly*, 64 (2), p. 98-103.
- McNeil, S. G., Robin, B. R. and Miller, R. M. (2000). Facilitating interaction, communication and collaboration in online courses. *Computers and Geosciences*, 26, p. 699-708.
- Rosenbaum, D. B. (2001). E-learning beckons busy professionals. *ENR*, 246 (21).p. 38-42.
- Ryan, S. (2001). Is online learning right for you? *American Agent & Broker*, 73 (6), p. 54-58.
- Schmidt, E. K. and Gallegos A. (2001). Distance learning: Issues and concerns of distance learners. *Journal of Industrial Technology*, 17 (3), found May 25, 2002 [www.nait.org](http://www.nait.org).
- Smallwood, J. E. and Zargari, A. (2000). The development and delivery of distance learning (DL) course in industrial technology. *Journal of Industrial Technology*, 16 (3), found May 25, 2002 [www.nait.org](http://www.nait.org).
- Wells J. G., (2001). Effects of an online computer-mediated communication course, prior computer experience and Internet knowledge, and learning styles on student’s Internet attitudes computer-mediated technologies and new educational challenges. *Journal of Industrial Teacher Education*, 37, (3), found May 15, 2002 Available Online: <http://scholar.lib.vt.edu/ejournals/JITE/v37n3/wells.html>.