

Articles

WebCT as an E-Learning Tool: A Study of Technology Students' Perceptions

Lesta A. Burgess

Introduction

Educators today are using distance education and Internet-based¹ learning as methods for delivering courses. There are many software packages specifically designed for electronic learning (e-learning), such as WebCT, Blackboard, and Prometheus. Before Internet access became widely available, instructors delivered asynchronous instruction via telephone, cable TV, videotape, or printed materials to distance learning students (Hazari, 1998). In recent years, universities have moved to Internet-based courses to attract students not able to attend traditional classes for various reasons. In the majority of cases, students enroll in Internet-based classes because of convenience while working toward a diploma or enhancing professional skills that may result in a promotion or career change (Hazari, 1998).

Teaching styles have to be adapted to this new environment because the Internet is a different medium. Faculty and students have to adjust to the pedagogy that uses instructional technology as an integral component in teaching. Many faculty who have not used instructional technology to accomplish course objectives in the past now have to be trained to do so, and they very often include a component in the course that provides information to students about the technology itself (Hazari, 1998). Students must be trained to work with instructional technology in order to be successful with online learning classes. This study sought to determine students' interest in using WebCT as a tool for completing courses online. It also sought to determine students' familiarity with WebCT. WebCT was selected because of its use by the university being studied. Two industrial technology courses were selected. Students were surveyed at the end of the course after they used WebCT for a variety of assignments and electronic interaction. The goal of this article is to inform those considering online education about students' perceptions of using WebCT. While some statistics are available for online programs as a whole, little research has been done in the area that focuses on a specific software package such as WebCT.

Lesta A. Burgess (L.Burgess@uni.edu) is Assistant Professor in the Industrial Technology Department at the University of Northern Iowa, Cedar Falls.

Since the study focused on students in a technology curriculum, it should have particular relevance to technology education professionals. There is reason to suspect that technology education majors may respond differently to online course experiences, since there is some evidence that their learning styles differ from those in other teaching majors (see Reed, 2001).

Distance Education

Distance education, the transmission of instruction from one location to multiple locations via telecommunications technology, has expanded at an exponential rate in post-secondary education settings (Smallwood & Zargari, 2000). This exchange of information between instructor and student can be in the form of compressed video/interactive television (ITV), video conferencing, satellite transmission, Internet, or Internet-based delivery used separately and/or in combination with traditional modes of instruction. Access to distance education may require students to be at a specific location at a specific time, such as with ITV, or the course can be made available via electronic files and accessed at the student's convenience. This is the case with Internet-based courses (Smallwood & Zargari, 2000). Thus, the more traditional method of teaching via lecture or face-to-face interaction could potentially be supplanted by students learning at their own pace, on their own time, and at any location with an Internet portal (Whitehead, 2001).

Internet-Based Learning

The use of the Internet as a tool for Internet-based learning (also called e-learning) has educators rethinking the way instruction is administered to students. Internet-based communication creates a variety of ways to deliver instruction and provide electronic resources for student learning. Some methods, such as using Web pages to deliver text in much the same way as hard bound texts, are very familiar to faculty. However, a big advantage is that the Internet also supports the delivery and use of multimedia elements, such as sound, video, and interactive hypermedia (McNeil, Robin & Miller, 2000). Curriculum, administration, and assessment are all affected as members of the educational community experience changes in communication and commerce that are a result of the explosive expansion of the Internet (Austin & Mahlman, 2001). Thus, many educators are looking at the way Internet-based learning can provide flexibility and convenience. Internet-based learning can overcome some traditional barriers such as time and place. A student can study independently online or take an instructor-led online class, which combines the benefits of self-study with those of more traditional classroom-based learning (Ryan, 2001). For working adults occupying an increasingly large percentage of our college population, and with greater numbers of students having computer and Internet experience prior to entering college, opportunities are being made to better meet their needs, interests, and work schedules through online classes

(Cooper, 2001). As university-level technology education programs begin to offer more online classes and degree programs, technology education professors may be in the position of developing online offerings (Flowers, 2001).

Internet-based learning does not require extensive computer skills, although familiarity with computers and software (especially Web browsers) does help to reduce the intimidation factor (Ryan, 2001). Internet-based learning generally fits into one of three major categories:

Self-paced independent study. Students determine the schedule and study at their own pace. They can review the material for as long as necessary.

Feedback from online quizzes takes the form of preprogrammed responses. Unfortunately, there is no one to whom the student can direct questions. This form of study requires the most self-motivation.

Asynchronous interactive. The students participate with an instructor and other students, although not at the same time. They attend classes whenever they need or until the course material is completed. This approach offers support and feedback from the instructor and classmates. It is usually not as self-paced as independent study.

Synchronous learning. Students 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 traditional classroom. Flexibility is restricted by the previously determined lecture schedule. There are limited course offerings in this format due to high delivery costs (Ryan, 2001).

Positive and Negative Aspects of Internet-Based Learning

Proponents argue that Internet-based courses actually succeed more than traditional instruction at discouraging student passivity and encouraging lifelong learning (Rosenbaum, 2001). Since Internet-based instruction is such a new medium, evidence of effectiveness of online courses compared to traditional instruction is lacking (Hazari, 1998). It is true that in an interactive, multimedia environment, students often find greater opportunities to learn by actively working through new concepts. This, of course, is dependent on the structure and kind of Internet-based learning tools made available to the student. For example, relatively low-tech presentations delivered online allow students to proceed slowly or click past material they already know. Ideally, Internet-based learning also promotes group learning and inquiry via serial e-mails known as “discussion threads” (Rosenbaum, 2001). Instructor tools that can improve or enhance classroom management include e-mail, digital drop box, discussion board, and the chat room. These tools can enable students and the instructor to have broader access to one another as needed (McEwen, 2001).

The advantages of Internet-based courses include: determination of time and place of learning “class time” by the student, access to global resources and experts, completion of coursework at home or at work, scheduling flexibility, and the ability to track progress (Gallagher, 2001; Smallwood & Zargari, 2000).

While Internet-based courses have advantages, it is equally important to note that there are disadvantages. These might include little or no “in-person” contact with the faculty member, feelings of isolation, a difficult learning curve in how to navigate within the system, problems with the technology, the need for the student to be actively involved in learning, and increased lead-time required for feedback regarding assignments (Smallwood & Zargari, 2000). Another disadvantage is the lack of availability of the hardware and software necessary for Internet-based learning.

WebCT

WebCT (Web Course Tools) was developed in 1995 by Murray Goldberg, a faculty member at the University of British Columbia. Universal Learning Technologies purchased WebCT in 1999. According to WebCT, “[It] is the most popular web course platform in higher education today. More than 39,000 instructors at over 1,350 colleges and universities use WebCT to deliver over 147,000 courses to more than 6 million student accounts in 55 countries” (www.webct.com).

WebCT integrates communication tools, including a bulletin board, chat room, private e-mail, and calendar on the WebCT site. In addition, graphics, video, and audio files can be incorporated into a WebCT site. Such features can facilitate interaction between faculty and students (Morss, 1999). These tools are available only to the students and instructor of the course, thus protecting the intellectual property of the instructor, the privacy of the student, and the course content from external parties.

WebCT also provides instructional tools to support course content such as a glossary, references, self-test, and quiz module. Students, too, can place assignments and other materials in WebCT for courses in which they are enrolled. WebCT also gives faculty course management tools for grading, tracking student interaction, and monitoring class progress. Students access their WebCT course materials using a Web browser from any computer connected to the campus Intranet or Internet (Morss, 1999).

A hardware problem with WebCT is that the program only runs on servers using the UNIX operating system. If the institution does not have a UNIX server or is unwilling to devote space on its server for WebCT, it will be impossible to offer WebCT at that institution. A second problem with WebCT is that it is heavily frame-dependent. Frames have a tendency to load slowly, can be cumbersome to navigate, and require more memory than Web pages without frames. Institutions considering WebCT as their e-learning tool will need to determine if students and faculty have the necessary computing power (Fredrickson, 1999).

The Study

The purpose of this study was to examine students’ interest in and familiarity with WebCT in order to determine its feasibility as a tool for

delivering classes in an Internet-based environment. In this study, WebCT was used as a supplement to traditional teaching methods in two sequential sections of an industrial technology course. The method of instruction in the course could be described as a combination of traditional face-to-face teaching complemented by synchronous interactive elements. Traditional methods included lecture, hands-on activities, and discussions. Students were required, at a minimum, to use the bulletin board feature of the system to view assignments and discussion questions posted by the instructor, and were required to send electronic versions of written assignments to the instructor's mailbox. There were a variety of other functions such as live chat sessions, a personal calendar for each student, and an electronic version of the syllabus available for optional use.

During the course of the semester, the students were gradually introduced to new features in the courseware package as it related to the corresponding course materials. For example, in the first two weeks of the course, the syllabus tool and calendar function were reviewed during class. Elements of the courseware that were required to be used were re-reviewed to assure that students would be successful when on their own after the scheduled meeting time.

The students ($n = 57$) were surveyed using pen and paper instruments at the end of the semester after using the courseware tool for a variety of assignments and electronic interaction opportunities. The survey instrument incorporated dichotomous and open-ended questions regarding their experiences with WebCT. The questions sought to determine whether the students perceived that they had used the e-learning tool effectively, what elements of WebCT they elected to use, what difficulties they might have encountered, and their overall opinions regarding this e-learning tool.

The first section of the instrument collected data about student use of and familiarity with WebCT. Questions asked how they learned to use WebCT, whether it was useful for the coursework and assignments in the class, and what, if any, technical problems they encountered. The second section of the survey inquired about their interest in using e-learning tools in the future. The last section collected demographic information.

Instrument Validation and Pilot Testing

The validity and reliability of the instrument was ensured by experts in related fields, as well as through a pilot test. The questionnaire was sent to five university faculty for validation. They were asked to evaluate the content of the instrument and to comment on the clarity and appropriateness of the items. Before implementing the survey, a pilot test was administered to fifteen students. A random sampling was used to select the participants. The purpose of the pilot test was to check the time required to finish the questionnaire, to determine if there were ambiguity and format problems, and to clarify items. According to the results of the pilot test group, the researcher made the necessary corrections.

The data were analyzed and descriptive statistics were calculated for the dichotomous items, and the qualitative data were analyzed for emerging themes

and consistency with the quantitative data. The data were then sorted by undergraduate major and contrasted on single questions and related-groups of questions. The results of that analysis follow.

Participants

The course selected for integrating e-learning tools was a core course on graphic communication applications, which had no prerequisites. Any student interested in the topic could register for the course, thus there was a wide variety of majors who took the class either as an elective in their program of study or as an open elective course for university credits. This particular course was selected due to the lack of prerequisites, the expected variation in students' skills and interest areas, and the suitability for integration of e-learning tools.

The undergraduate majors in the course were studying Graphic Communications (35.1%), Technology Education (29.8%), Technology Management (10.5%), General Industry (5.3%), Manufacturing Technology (3.5%) and Marketing (3.5%). There was also one student each from Art, Interpersonal Communications, Art Studio, English, General Studies, as well as an Undecided major. The demographic information collected did not include gender or age. Also, the amount of computer experience each participant had prior to enrolling in the class was not measured. The majority of participants (83.9%) were undergraduate and graduate majors in technical or industry-related fields. Upper class (juniors and seniors) or graduate students comprised 80.7% of the sample.

Results

For the majority (94.7%) of students, this was the first time they had used WebCT or any courseware tool. The students appeared to learn the basic concepts of using WebCT easily and required little additional instruction or help from the instructor during the face-to-face class meetings. Comments on the need for additional instruction after introduction to the software included, "It was very easy to figure out," "Clear instructions," "WebCT is self-explanatory," "Didn't really need help."

The calendar function, i.e., important dates relevant to the course generated by the instructor, was reported as the most frequently used tool in the WebCT courseware package. This tool simply required the student to navigate to the calendar page, as updating with personal information was an option. Use of this tool would be similar to referring to a course calendar in a standard, paper-copy course syllabus, albeit the calendar function is a dynamic version of a syllabus. In addition to the calendar, the bulletin board function was regularly used by the instructor to post questions relevant to the course and solicit responses and discussion from the students. This function and the assignment posting feature were the second most commonly used WebCT elements reported by the students.

When asked whether WebCT was useful in electronic communications with regard to the class, more students indicated that contacting the instructor was

more useful than connecting with fellow students in the course. Some of the reasons for this included: “. . . She could respond to all of us,” “I knew I could get a hold [sic] of you anytime,” “Always got prompt answers,” “Never used it [communicate with students]; I just talked to them,” “Had no reason to communicate with them [classmates],” “Never used it.” On the whole, the students found WebCT useful for their course (78.6%). The frequencies and percentages for survey questions regarding use of WebCT are displayed in Table 1.

Table 1
Survey Items Regarding Use of WebCT

Question	Response	f	%
Is this the first time using WebCT?	Yes	54	94.7
	No	3	5.3
Did you need additional instruction in using WebCT?	Yes	21	36.8
	No	36	63.2
What WebCT element did you use most frequently?	-Calendar	36	63.2
	-Bulletin board	10	17.5
	-Chat room	2	3.5
	-Assignment	9	15.8
Was WebCT useful for communicating with the instructor?	Yes	44	77.2
	No	13	22.8
Was WebCT useful for communicating with your classmates?	Yes	28*	49.0*
	No	28	49.0
Did you find WebCT useful for your coursework?	Yes	44*	78.6*
	No	12	21.4

*Missing data not included in frequency and percentage calculations.

A majority of students (52.6%) reported no technical problems with the software, and for those who did encounter problems, submitting assignments was the most burdensome task. Some specific examples of problems given by the students were: “Sometimes hard to download and post things,” “Seemed difficult at times to post assignments,” “Having to write assignments somewhere else and then load them up,” “Posting/replying was kind of confusing,” “Not knowing when I had to check it for something new,” “Hard to understand the procedure.” It should be noted that there were also a large number of comments stating no difficulties were encountered.

Further analysis showed that Technology Education undergraduate majors had a strong positive response to the question of the usefulness of WebCT as a course tool. When considering reported technical problems with the software, Technology Education as a group had fewer problems than many other undergraduate majors. Additionally, Technology Education majors responded

that they would enroll in a distance education course using only WebCT as their only contact with the instructor. Those students who reported they would not enroll in a distance education course using only WebCT as their only contact with the instructor (42.1%) cited reasons such as: "I like the face-to-face contact with the instructor," "I don't have that good of a computer at home," "Too difficult for me to use."

Other groups of undergraduate majors liked the idea of online education. The frequencies and percentages for survey questions about difficulties with WebCT, desired future use of the technology, and using WebCT as a singular mode of learning are displayed below in Table 2.

Table 2
Survey Items Regarding Technical Problems and Future Use of WebCT

Question	Response	f	%
Did you have any technical problems with WebCT (select all that apply)?	Logging on to WebCT	4	7.0
	Submitting assignments	19	33.3
	Accessing the calendar	0	0.0
	Posting/replying on bulletin board	4	7.0
	Sending/receiving private e-mail	0	0.0
	Other	0	0.0
	Did not have any problems	30	52.6
Which one item would you like to see WebCT used for?	Assignments online vs. hard copy	22	38.6
	Quizzes / tests	13	22.8
	Class discussions using chat room	4	7.0
	Bulletin board communication	11	19.3
	Other	7	12.3
Would you enroll in a distance education course with WebCT as your only contact with the instructor?	Yes	33	57.9
	No	24	42.1

Conclusion and Recommendations

In conclusion, it seems that WebCT is a useful tool for students who are comfortable with the technology and do not encounter serious technical problems. Technology Education majors indicated their acceptance of this mode of information access in greater degrees than their classmates in other majors. It could be inferred that Technology Education majors are more willing than other student majors to embrace new or emerging electronic formatted text-based or graphics-enhanced media. Further research on this issue would be warranted.

Overall, the results of the study indicate that student interest in the WebCT is tempered by initial experiences with the technology. For students who struggled with uploading assignments, using the calendar or bulletin board

features, or checking for new postings on a regular basis, e-learning was perceived to be time consuming and/or challenging. However, the majority of students adjusted to the technology quickly and with enthusiasm.

Further research needs to be conducted to determine whether e-learning is being accepted by students and/or whether e-learning is better than traditional instructional methods. It is also recommended that studies be undertaken concerning the pedagogical methods that are employed in using e-learning tools. Finally, it is recommended that the study be repeated with a larger sample size and with in-depth interviews with the participants possibly conducted.

Endnotes

- ¹ For the sake of clarity, the Internet is defined as “a massive network of networks” that includes the World Wide Web (Web), e-mail, Usenet groups, instant messaging, and file transfer protocol (FTP).
[http://www.webopedia.com/DidYouKnow/Internet/2002/Web_vs_Internet.asp]
- ² As a result of an internal panel review of courseware packages currently on the market, the author’s institution selected WebCT as the e-learning tool to be offered to the faculty for their Internet-based courses

References

- Austin, J. T., & Mahlman, R. A. (2000). Using the Internet for career – technical assessment: A pilot project in Ohio. Retrieved December 31, 2002, from <http://scholar.lib.vt.edu/ejournals/JCTE/v16n2/austin.html>
- Cooper, L. W. (2001). A comparison of online and traditional computer applications classes. *THE Journal*, 28(8), 52-58.
- Flowers, J. (2001). Online learning needs in technology education. *Journal of Technology Education*, 13(1), 17-30.
- Fredrickson, S. (1999). WebCT. *THE Journal*, 26(11), 67-77.
- Gallagher, J. (2001). E-learning success depends on employee’s role. *Insurance & Technology*, 26(7), 55-57.
- Hazari, S. I. (1998). Evaluation and selection of web course management tools. Retrieved March 13, 2003, from <http://sunil.umd.edu/webct>
- McEwen, B. C. (2001). Web-assisted and online learning. *Business Communication Quarterly*, 64(2), 98-103.
- McNeil, S. G., Robin, B. R., & Miller, R. M. (2000). Facilitating interaction, communication and collaboration in online courses. *Computers and Geosciences*, 26, 699-708.
- Morss, D. A. (1999). A study of student perspectives on Web-based learning: WebCT in the classroom. *Electronic Networking Applications and Policy*, 9(5), 393-408.
- Reed, P. A. (2001). Learning style and laboratory preference: A study of middle school technology education teachers in Virginia. *Journal of Technology Education*, 13(1), 59-71.
- Rosenbaum, D. B. (2001). E-learning beckons busy professionals. *ENR*, 246(21), 38-42.

- Ryan, S. (2001). Is online learning right for you? *American Agent & Broker*, 73(6), 54-58.
- Smallwood, J. E., & Zargari, A. (2000). The development and delivery of a distance learning (DL) course in industrial technology. Retrieved December 31, 2002, from www.nait.org
- Whitehead, M. (2002). Learning by remote. *Supply Management*, p. 26-27.