Foundations of online education at Tarleton State University

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ABSTRACT

Online course delivery has been used for many years in higher education. Like many institutions, Tarleton State University has used online education as a means to increase student enrollment and satisfy the changing education needs of both traditional and non-traditional students. The purpose of this study was to examine the origins of online education at Tarleton State University and explore the benefits to both the students and the university. Data related to online and traditional student course enrollments were extracted from the university student records system and personal interviews were conducted with faculty and staff responsible for implementing and maintaining the online course management system. Tarleton State University was an early adopter of technologies used to deliver courses online. As a result of online course delivery, Tarleton State University has realized an increase in enrollments and a cost savings when compared to Traditional course delivery.

Keywords: online education, course delivery, instructional delivery costs

INTRODUCTION

The first documented example of a completely online educational program occurred in 1982 at the Western Behavioral Sciences Institute (WBSI) (Feenberg, 1993; Harasim, 2000). Since that time, online education has experienced rapid growth (Allen & Seaman, 2008). According to a survey conducted by the Sloan Foundation, there was a 35% growth in online enrollments from 2004 to 2005 (Allen & Seaman, 2006). As of fall 2007, more than 3.9 million students were enrolled in at least one online course representing more than 20% of all students in higher education (Allen & Seaman, 2007).

The student benefits of online education include flexibility, convenience, and in the case of non-traditional students, access to higher education (Lee, Cheung, & Chen, 2005; Matthews, 1999; Richardson & Swan, 2003; van Shaik, Barker, & Beckstrand, 2003). From the institution's perspective, benefits can include increased enrollment and reduced overhead from teaching traditional courses (Matthews).

Research about the origins of online education included the history of collaboration between researchers working on the Department of Defense's Advanced Research Projects Agencies network (ARPANET) (Harasim, 2000; Waldrop, 2008), the first online program offerings at the WBSI (Feenberg, 1993), and the growth of online course offerings among universities as an alternative delivery format (Allen & Seaman, 2008).

According to George Mollick, former director of the Center for Instructional Technology and Distributed Education (CITDE) at Tarleton State University, the adoption of online course delivery at Tarleton State University took several years and was the result of a push from the faculty (personal communication, February 17, 2010). As of fall 2008, roughly 13% of all students at Tarleton State University were enrolled in at least one online course. Despite the ubiquitous nature of online education, no research was found that clearly identified its origins and/or use as an educational delivery system at Tarleton State University.

PURPOSE AND OBJECTIVES

The purpose of this study was to document the historical foundations for online education and to identify its growth at Tarleton State University, Stephenville, Texas.

Two objectives guided this study. The first objective was to describe the origins of online education as an extension of the broader field of distance education. The second objective was to describe the history and current state of online education at Tarleton State University.

HISTORY

Online course delivery may take many forms, but Harasim defines an online course as one whose primary mode of instruction takes place using the web (2000). Allen and Seaman (2008) defined an online course as "A course where most or all of the content is delivered online. Typically have no face-to-face meetings." (p. 4) Additionally, an online course does not require a synchronous connection between the student and instructor. One of the most often cited benefits of online education is the ability to take courses wherever and whenever it is convenient for the learner (Matthews, 1999; Richardson & Swan, 2003). Online courses also benefit the instructor by allowing them the freedom to administer and facilitate the course from their home or office and without the need to occupy a classroom.

To better understand the history of online education, the technologies that made it a reality are described in the following sections. The innovations that made online education possible included the Internet, e-mail, and the World Wide Web.

The ARPANET

The earliest widespread use of computer networks for collaboration between universities began with the creation of a multi-site network by the Advanced Research Projects Agency (ARPA) of the Department of Defense. This network came to be known as the ARPANET. The project started with a memo from Joseph Carl Robnett Licklider, head of the computer research program at DARPA, on April 23, 1963 (Waldrop, 2008). According to Bolt, Beranek, and Newman, Inc. (BBN, 1981), there were two original objectives for the ARPA Program:

> (1) To develop techniques and obtain experience on interconnecting computers in such a way that a very broad class of interactions are possible, and (2) To improve and increase computer research productivity through resource sharing. (p. 9)

Many of the technologies required to make the ARPANET a reality were already created and in use on smaller networks, but most needed additional refinement for use on the scale needed by the Department of Defense (BBN, 1981). After several years of development and programming by the researchers at ARPA, the first message was sent via the ARPANET between UCLA and the Stanford Research Institute on October 29, 1969. By December 1970, the ARPANET consisted of 13 computers (nodes) connected via leased phone lines from AT&T. The phones lines provided an always-on connection between the different sites on the network. Leasing the existing phone lines from AT&T greatly reduced the installation costs of the network and is still a solution that is widely used today (Waldrop, 2008).

The Birth of Electronic Mail

In 1971, an electronic mail (e-mail) program for the ARPANET was created by Ray Tomlinson, one of the project leaders at BBN (Leiner et al., 1997). The concept of e-mail was not new at the time. Local e-mail was already being used on the time sharing computers at other ARPA projects. However, Tomlinson decided to implement e-mail on a larger scale so it could be used across the entire ARPANET. Since the ARPANET was comprised of multiple computers, a solution was required that would direct the e-mail to the correct user on the correct computer. Tomlinson's solution was to create a unique address for all recipients on the ARPANET. His solution is still the standard for all e-mail addresses: username@hostname (Hobbes, 2010; Waldrop, 2008).

E-mail took the place of interoffice memos and allowed someone to send an electronic message across physical barriers. No longer was it necessary to mail a letter or send typed memos through the U.S. postal physical delivery processes. It was not long before e-mail was the "most popular application on the network." (Waldrop, 2008, p. 83)

Throughout the 1970s and 1980s, e-mail was used in educational settings first to facilitate information exchange and then as a way to supplement university-level courses (Harasim, 2000). For distance education purposes, e-mail and the growth of computer networks allowed universities to expand course offerings and reach students that would not normally have access to the universities facilities. Using the new technologies, the university could grow enrollments without necessarily having to add additional classroom space (Matthews, 1999).

For most of the 1970s online collaboration between student and teacher was largely limited to e-mail (Harasim, 2000; Matthews, 1999) or asynchronous delivery of information (Feenberg, 1993; Harasim). Starting in the 1980s, online collaborative learning using computer conferencing started to emerge. Using computer conferencing systems, students were able to interact synchronously and faculty began to adopt group learning activities (Harasim).

World Wide Web

Having worldwide communication and access to data was a huge breakthrough for instruction, collaboration, and research purposes. However, there was no easily accessible way for the effective management of the available data. Information was still stored on different systems and in different formats.

Several organizations were using a form of hypertext to link and organize data, but until 1989, no one had thought to link the use of hypertext with the Internet (Gillies & Cailliau, 2000). In March of 1989, Tim Berners-Lee created a proposal for what would become the World Wide Web. Berners-Lee was working for the European Council for Nuclear Research (CERN) when he was given the freedom to explore and create the foundations of the World Wide Web. Using a NeXT computer system, Berners-Lee created the first web-browser and by December of 1990 had a working prototype of the web-browser and server (Gillies & Cailliau). This early browser did not support a mixture of graphics and text, but that innovation would soon follow.

In 1991, the Internet became available for commercial use (Gillies & Cailliau, 2000). While Internet and World Wide Web are used almost interchangeably in common language, the World Wide Web is just one branch of the broader Internet. Specifically the World Wide Web consists of all the HTML documents stored on all servers across the Internet that are transmitted using the Hyper Text Transfer Protocol (HTTP) (Gillies & Cailliau; Merriam-Webster.com.com, n.d.). Merriam-Webster's online dictionary defines the Internet as "an electronic communications network that connects computer networks and organizational computer facilities around the world" (n.d.).

Now that the Internet was available for commercial use and the World Wide Web facilitated the organization and distribution of content, the growth of distance education using online course delivery was ready to expand. In 1993, the Mosaic web browser was released (Andreessen & Bina, 1994; Hobbes, 2010) and was the first successful browser to deliver web content that contained graphics and text in a single web page (Andreessen & Bina). By 1995, the World Wide Web became the Internet service with the most traffic based on amount of data sent/received (Hobbes).

In the United States, less than 10 states had online education programs in 1992. By 2004, all 50 states had some form of online learning programs available at the college level (Lynch, 2004). According to a survey conducted by the Allen and Seaman (2008) in fall 2002, online enrollments represented 9.6% of the total number of students enrolled in degree-granting postsecondary institutions. In fall 2007, online enrollments as a percentage of total enrollment rose to 21.9%. The compound annual growth rate for online course enrollments from fall 2002 to fall 2007 was 19.7% (from 1.6 million in fall 2002 to 3.94 million in fall 2007). By contrast the annual growth rate for total enrollments was roughly 1.6% during the same period growing from 16.6 million students in fall 2002 to 19.97 million students in fall 2007 (Allen & Seaman, 2008).

Roughly 15% of the institutions involved in the Allen & Seaman survey (2008) began offering online courses prior to 1999, but 20% of the institutions included in the survey introduced online courses for the first time in 2007. The institutions that were early adopters of online education are also the institutions with the widest assortment of online course options. The early adopters were also the institutions with the largest online enrollments (Allen & Seaman, 2008).

The adoption/diffusion of a technological innovation categorizes adopters into five categories: innovators, early adopters, early majority, late majority, and laggards (Rogers, 1995). Mytinger suggested that size of an organization was "perhaps the most compelling concomitant to innovativeness" (as cited in Rogers, 1995, p. 409). According to Rogers (1995), larger organizations tend to be more innovative because larger organizations typically have more resources, technical expertise, and other characteristics that allow for increased innovativeness. The generalization that larger organizations tend to be more innovative was supported by the research about online course offerings conducted by the Sloan Consortium (Allen & Seaman, 2006; Allen & Seaman, 2007; Allen & Seaman, 2008).

ONLINE EDUCATION AT TARLETON STATE UNIVERSITY

In the fall of 2008, Tarleton State University had a total unduplicated headcount of 9,634 students across all campus locations. The Sloan Consortium classifies universities by size into five categories: Under 1,500; 1,500 – 2,999; 3,000 – 7,499; 7,500 – 14,999; and over 15,000 (Allen & Seaman, 2006; Allen & Seaman, 2007; Allen & Seaman, 2008). Using the Sloan categories, Tarleton State University would be categorized into the group of large universities. Does the adoption of online education at Tarleton State University align with the assertion by Rogers (1995) and Mytinger that larger organizations tend to be more innovative?

According to Nick Lilly, Tarleton State University's Manager of Classroom and Lab Support in the Center for Instructional Technology and Distributed Education (CITDE), Tarleton began offering online courses in fall 1996. Templates were developed with outside assistance from West Texas A&M University and the courses were delivered using online bulletin board software. The first courses to transition to the online format were technical writing and introduction to literature. However, no courses were officially listed as "online" in a course catalog until 1998 (personal communication, January 16, 2010). From those early beginnings, online course offerings have grown steadily.

In academic year 2009, Tarleton offered 342 courses totally online as indicated in Figure 1 (Appendix), which represented a 139% increase in the number of courses offered online from academic year 2005. During the same period, traditional course offerings also grew, but at a decreased rate of 3% as indicated in Figure 2 (Appendix). For purposes of this article, online courses included only those courses taught with an instruction code of "lecture" and a building code of "online." Traditional courses were defined as courses with a building code other than "online" and with an instruction code of "lecture." Hybrid courses were indicated with an instruction code of "lecture with online components" and were not included in this study.

Overall enrollment in online courses remained steady at an average of 14 students per course in fall 2004 to 15 students per course in fall 2008. For the 2008 fall semester, 11.4% of all students were enrolled in one or more online courses compared to 6.6% in the fall of 2004 as indicated in Table 1 (Appendix).

In the fall of 2004, there were 596 students taking at least online course at Tarleton State University. In that same semester 7,038 students were enrolled in at least one lecture-based traditional course. In all, 404 students were taking both online and traditional lecture-based courses with 147 students only taking lecture-based online courses.

By the fall of 2008, 1,095 students were taking at least one online course at Tarleton State University, which represented an 86.2% increase in online enrollments. Overall university enrollment grew 6.6% from 9,033 in the fall of 2004 to 9,634 in the fall of 2008. The growth of enrollments in online course offerings at Tarleton State University followed the growth trend noted in the Sloan reports with online enrollments growing at a faster rate than overall enrollments (Allen & Seaman, 2006; Allen & Seaman, 2007; Allen & Seaman, 2008).

Research indicated that institutions considered online course offerings as more cost effective and convenient than traditional course offerings (Matthews, 1999; Richardson & Swan, 2003). Tarleton State University invested in technology and resources to support continued growth in online course enrollments. The growth of online programs resulted in increased semester credit hour generation. According to the Tarleton State University (n.d.) online Fact Book, online courses generated 1,581 semester credit hours in fall 2002. By fall 2008, online semester credit hours had increased to 5,720. The 2007-2009 strategic plan states as part of outreach and off-campus initiatives Tarleton State University will, "Extend services through development of off-campus, on-line, continuing education, and community education learning opportunities" (Tarleton State University Planning Council, 2007, p. 9).

From fall 2004 to fall 2008, Tarleton State University expanded online course and program offerings to meet the increased demand from students and to tackle growing pressure to reduce costs while maintaining academic accreditation and funding. Pressure from for-profit online universities increased the need for Tarleton to continue growth of online courses and programs in order to remain competitive and attract students. According to Brad Chilton, Vice President of Enrollment and Information Management, Tarleton State University had a traditional student base from the 42 county area surrounding Stephenville (personal communication, May 13, 2010). With the change in demographics and decrease in population of the traditional student base, Tarleton invested in online course delivery and online program development as a means to attract and retain students.

As of fall 2008, Tarleton State University offered both undergraduate and graduate courses online. In fall 2009, the Texas Higher Education Coordinating Board and The Texas A&M University System authorized Tarleton State University to offer a Masters Degree in Criminal Justice as an online program starting in Spring 2010. In total, Tarleton State University offers seven online Masters Degree programs. Additionally, Tarleton was developing 11 online undergraduate degree completion programs across several disciplines. Tarleton State University will continue to explore opportunities to expand online course offerings in an attempt to reduce costs and to meet the needs of students.

State of Texas Funding

In a 2010 memo from the Texas Governor's office, state agencies were asked to reduce their general revenue and general revenue-dedicated appropriations by 5% for the 2010-2011 biennium (Governor Rick Perry, personal communication, January 15, 2010). Public universities are considered state agencies and have also been tasked with the 5% reduction. The total planned reduction for Tarleton State University was $2,768,951. The proposed cuts to the

Tarleton budget were in three primary areas: Purchased utility savings, operations and maintenance reductions, and position savings. The majority of the reduction, approximately 1 million dollars each fiscal year, comes from position savings realized by a hiring freeze, position reclassifications, and possible elimination of vacant positions. These cuts met the short term goal of the 5% reduction. However, due to economic uncertainty, Tarleton State University worked to identify more long-term cost saving strategies.

Online course delivery was one avenue university administrators explored to reduce some of the costs associated with instruction while continuing to serve the needs of the students, faculty and staff. The initial resource requirements to setup online course delivery are often cited as a disadvantage of offering online courses (Matthews, 1999; Williams, Nicholas, & Gunter, 2005). However, once the infrastructure is in place, online course delivery potentially provides a means to deliver instructional content at a reduced cost (Batts, Friend, & Dunn, 2009). There are still costs associated with online course delivery. The need for instructional designers, course facilitators, and personnel to maintain the hardware and software systems are still required. According to Credence Baker, current director of the CITDE at Tarleton State University, the total administrative and technical cost per online course for the 2008-2009 academic year was approximately $1,105 (personal communication, February 26, 2010).

The cost savings with online course delivery are realized through savings on the classroom facilities and overhead associated with a traditional face-to-face course (Matthews, 1999; Richardson & Swan, 2003). According to Joe Standridge, Associate Vice President of Physical Facilities at Tarleton State University, the utility and maintenance annual cost of instructional space for the 2008-2009 academic year was approximately $3.25 per square foot. Utility and maintenance cost were still paid on facilities required to host servers and equipment used for online course delivery; however, Standridge suggested that the cost per square foot drops approximately $2.00 for each course taught online (personal communication, February 26, 2010).

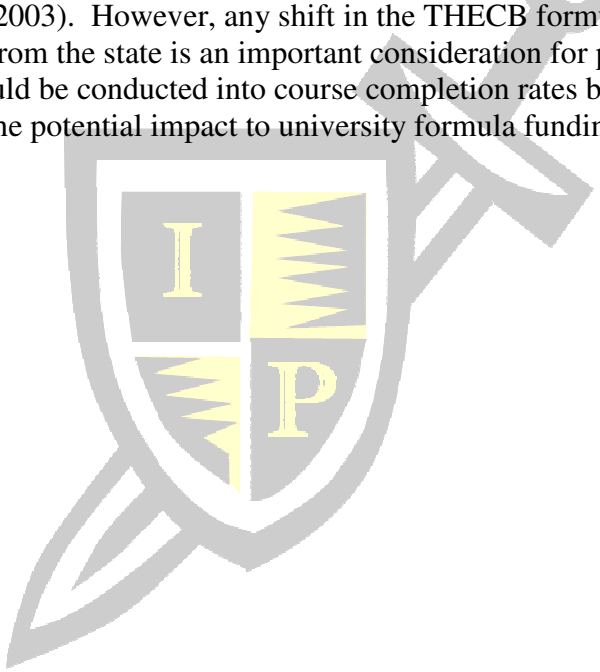
Online courses potentially reach a student base that may not otherwise attend the university (Rivera & Rice, 2002). According to the Tarleton State University online tuition and fee calculator, a three-hour online course would produce $625 in tuition and fees. In the fall of 2008, there were 290 students taking only online courses. These students contributed approximately $181,247 in tuition and fees to Tarleton State University. Additionally, Tarleton State University offered 342 online courses during the 2008-2009 academic year. By offering these 342 courses online, the university reduced the utility and maintenance costs and met the needs of some students that may have otherwise selected a different university.

In addition to the potential cost benefits to Tarleton State University, research indicates online education has benefits for the student as well. Benefits often cited with online course delivery are increased access to higher education (Matthews, 1999), self-paced learning (Lee et al., 2005), flexible schedule (Matthews), accessible anytime (Lee et al.; van Shaik et al., 2003), and accessible anywhere (Lee et al.; van Shaik et al.). With the aforementioned benefits, does online course delivery lead to increases in course completion and student performance? What student characteristics are useful predictors of student success in online courses? Additional research comparing online and traditional course delivery is needed to address these questions.

CONCLUSION

While documented evidence about the exact origin of online course delivery at Tarleton State University could not be found, anecdotal evidence suggests that Tarleton State University started teaching online courses in the mid-to-late 1990s. The initial courses were developed by faculty and technical staff that had the foresight to realize that online course delivery was a way to meet the needs of both faculty and students. The growth of online courses at Tarleton State University is not uncommon compared to public universities of comparable size (Allen & Seaman, 2008).

With state mandated budget reductions, Tarleton State University can potentially generate cost savings by increasing online course offerings. The Texas Higher Education Coordinating Board (THECB) has also recently made recommendations that formula funding for public universities switch from funding based on attempted semester credit hours to funding based on completed hours (THECB, 2008). There was conflicting research on course completion rates between online and traditional course delivery (Brady, 2001; Carr, 2000; Roach, 2002; Simpson, 2003). However, any shift in the THECB formula funding that could result in lower funding from the state is an important consideration for public universities. Additional research should be conducted into course completion rates between online and traditional courses and the potential impact to university formula funding.



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APPENDIX

Table 1

Total and Online Enrollment Fall 2004 – Fall 2008

Semester and Year	Total Enrollment	Students Taking at Least one Online Course	Online Enrollment as a Percent of Total Enrollment
Fall 2004	9,033	596	6.6
Fall 2005	9,140	567	6.2
Fall 2006	9,464	665	7.0
Fall 2007	9,460	835	8.8
Fall 2008	9,634	1095	11.4

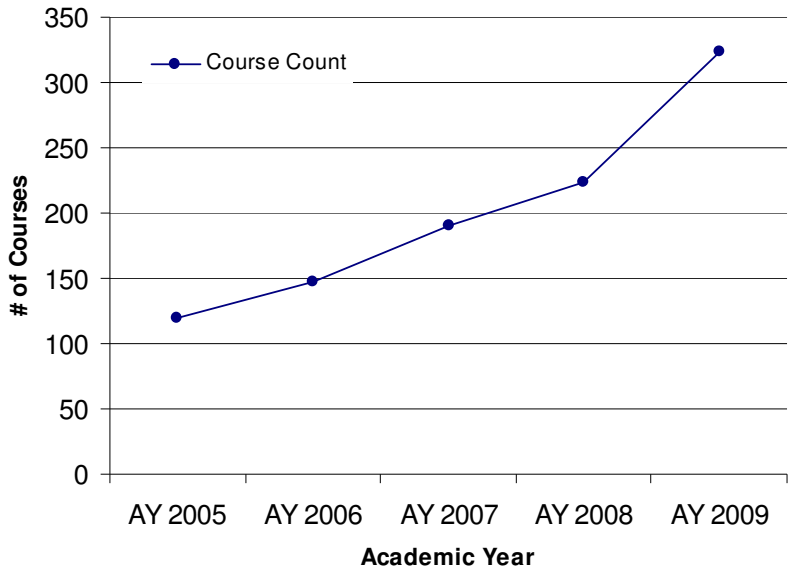

Figure 1. Online course offerings at TSU from academic year 2005 through academic year 2009.

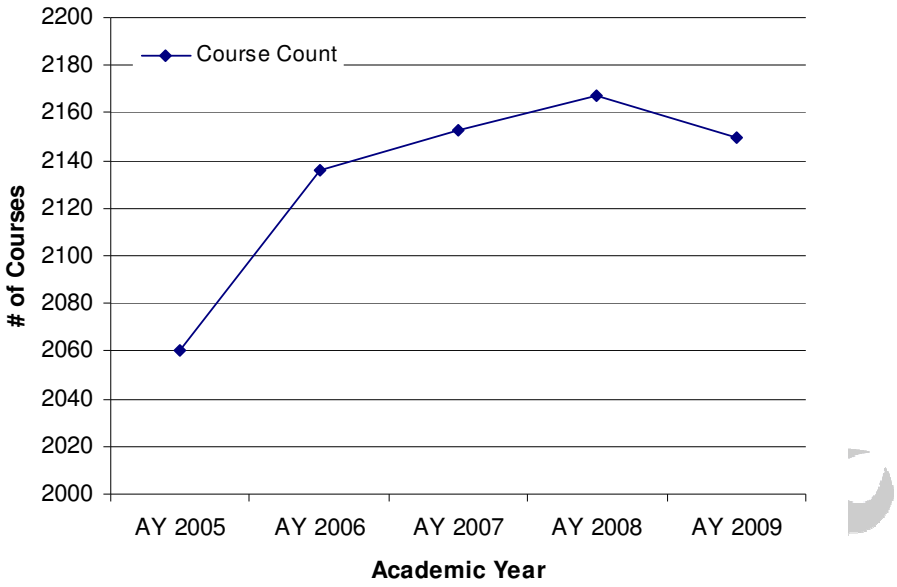

Figure 2. Traditional course offerings at TSU from academic year 2005 through academic year 2009.