Distance Education Technology: Higher Education Barriers During the First Decade of the Twenty-First Century

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Abstract

In the twenty-first century, despite the expanded opportunities technology affords in student-access to higher education, most institutions of higher education are hesitant to offer technology-based distance education (TBDE). The prohibiting factors include cost, accessibility, faculty concerns, state mandates, academic administrative actions, and unit operations. Differences exist in the prohibitive factors prevalent at the start and at the end of the first decade of the 21st century. Knowledge of the differences may aid higher education TBDE administrators identify or allude to barriers pertinent to their institution. Higher education administrators of institutions relatively new or limited in the use of TBDE are most likely to experience the gamut of TBDE prohibitive factors of the first decade of the 21st century. Whereas higher education administrators of institutions not new to the use of TBDE or who are at an innovative stage in the use of TBDE are most likely to experience TBDE prohibitive factors of the latter part of the first decade of the 21st century. In this paper prohibitive TBDE factors prevalent at the start of the 21st century and those prevalent a decade afterwards are discussed.

Introduction: The State of Distance Education in Higher Education

With globalization, the growing popularity of online programs, and the looming worldwide recession, higher education may have to succumb to the growing need for integration of distance education as an instructional option, if it is to meet its enrollment needs and the needs of society. Despite distance education's emergence a decade ago as a major force in higher education (Primary Research Group, 1997), its rate of adoption has been slow. During the period of 1995 to 1998, institutions in America offering distance education courses grew only 11%, an average of less than 4% a year. Even then, this growth from 33% to 44% was not in complete programs (Boettcher, 2000). On the other hand, during the same period (1994-1995 and 1997-1998), institutions that offered distance education type degrees and certified programs before this period doubled the programs they were offering (NCES, 2000).

More recently, in the fall semester of 2005, nearly all higher education institutions (96% of them) with enrollments of 15,000 or more offered online distance courses resulting in an online enrollment of 3.2 million students (Allen & Seaman, 2005, 2006). Yet even with such favorable enrollment numbers in 2006, a year later in 2007, only one-third of the number of higher education institutions accounted for three-quarters of all online enrollments (Allen & Seaman, 2007).

There are a number of reasons for the slow rate of adoption of distance education by institutions of higher education. The decade–old reasons persist and range from the inhibiting cost of equipment to lack of faculty participation (Rockwell, Schauer, Fritz, & Marx, 1999; Chen, 2009). Higher education administration's ability to effectively implement technology-based distance education (TBDE) may be enhanced with detailed insights on factors such as cost, accessibility, faculty concerns, and academic facilitation that prohibit or permit the implementation of technology-based distance education.

Implementation of Distance Education: Higher Education Barriers at the Start of the 21st Century

Cost

Statistics reveal that among all of the factors that frequently keep institutions from embarking upon or expanding their technology-based distance education course offerings, program or course development costs hinder the process the most by 43% (NCES, 1997). A significant example of a cost-related potential hindering factor is the change in federal technology expenditure. The federal government's 2001 budget proposal for the Department of Education called for cutting off further support for the Learning Anytime Anywhere Partnerships (LAAP), a popular program among colleges and universities, which helped many institutions of higher education experiment with innovative distance-learning programs. The program received $10 million in 1999, $23.3 million in 2000, and $30 million in 2001 (Carnevale, 2001); however, by 2004 the resources were archived (Fund for the Improvement of Postsecondary Education [FIPSE], 2006). Currently, federal funding of technology for higher education is nestled in grants, and the capability of an institution to write winning grants serves as a major determinant factor for technological funding.

In addition to federal changes in technological spending, state mandates impact program costs as well. According to Taylor, Parker, and Tebeaux (2007) a major financial demise of public institutions in implementing TBDE is "determining pricing strategies that must follow state-mandated guidelines while remaining cost-effective to university budgets, which are always under stress" (p.17).

In addition to external factors, program costs and profits associated with TBDE are dependent on internal factors. During the year 2000, the Alfred P. Sloan Foundation commissioned studies to explore the financial costs and potential profitability of distance learning at six universities, namely, the Rochester Institute of Technology, the University of Illinois at Urbana-Champaign, the University of Maryland's University College, and Drexel, Pace, and Pennsylvania State universities (Carr, 2001). The results revealed that in addition to the anticipated added cost of technical support, technology, and extra faculty pay that make online programs more expensive to deliver, unforeseen factors such as discounted tuition rates, lower-than-expected initial enrollments, and continued expansion of the universities' operations contribute to the expense of distance learning.

Another aspect that needs consideration in technology costing, according to the Sloan Report (Alfred P. Sloan Foundation, 2000), is the difficulty in defining and enumerating the relevant distance education costs separate from the traditional parallel costs (Bates, 2000; Carr, 2001). The implication thus far is that distance education is not cost effective.

Accessibility

Access to education provided by distance education is essential for learners who are truly place-bound due to factors such as employment, child-care demands, disability, or remoteness of the location where they live (Rintala, 1998). The flexibility of distance education is also due to the convenience of time, place (St. Pierre, 1998), and self-pace it affords. Its accessibility also promotes lifelong learning.

Paradoxically, however, the increase in accessibility is also causing a decrease in accessibility. The issue of the "Digital Divide" based on the current demographic patterns of Internet access and usage indicate that key demographic variables like income and education influence accessibility to distance education (Hoffman, Novak, & Schlosser, 2000). The more complex and expensive distance education delivery systems become the more inaccessible learning becomes to the low-income bracket of society.

Then there is the issue of "equal access" to higher education. Although many accommodations for students with print impairments or other disabilities are computer-based, the design of most distance education courses lags behind mainstream technology innovations and remains inaccessible to some learning impaired students (Treviranus, n.d.). The two concepts, cost effectiveness and accessibility, associated with distance education are not the only debatable issues emerging from the various research findings and opinions.

Instructional Faculty Concerns

Faculty also express various misgivings and levels of support for the implementation of distance education in postsecondary institutions. It is important to identify and address faculty concerns about distance education, as faculty are the key element in the teaching and learning process (Rockwell et al., 1999). Faculty provide instructional leadership, instructional design, and detailed programs necessary for successful implementation of distance education (Olcott & Wright, 1995). It is vital to confront prohibiting forces in order to empower faculty to engage in active distance teaching (Dede, 1990). Some of the areas in the distance education process that concern faculty are supported by the following related research findings.

The role of the instructional faculty shifts from being the locus of control of all aspects of instruction to facilitator (Beaudoin, 1990; Cuban, 2000; Olcott, 1996), a role faculty are not trained to execute. Faculty are unwilling to accept this role as it goes against the very training they received.

In addition, faculty find that the roles of library services and academic and student services that complement their teaching are changing concurrently. The Web libraries are gradually substituting academic libraries, and business companies are in the market to offer academic and student services (Estabrook, 1999).

The technology market is also looking to transform university distance education courses into courseware for sale. Noble (1997) described this as a means of robbing faculty of their product and ultimately their livelihood. Faculty are concerned, particularly as their objection to education courses as courseware is being portrayed as obstructing the progress virtual education will provide to a demanding public (Noble, 1997).

In addition, the intertwining of intellectual and emotional bonds between instructor and student that traditionally characterize teaching is lost with the introduction of distance education. "It is no accident that computer labs in schools and universities are the most popular way of organizing use of new technologies" (Cuban, 2000, p. 15).

One of the advantages of distance education practices in universities is that it allows institutions of higher learning to hire instructional faculty from a variety of other institutions. The obvious benefits of this practice are the enrichment of educational experience for the students. However, this practice causes faculty concern in regards to determining who the responsibility of the overall curriculum falls on (Estabrook, 1999).

> Historically, education prepares students to function as effective citizens in all aspects of a democratic society. With the introduction of technology, the emphasis is not as comprehensive as it was intended to be. There is more emphasis on the preparation of students for the technological workplace and less on affording teachers the opportunity to mold students into caring, thoughtful and responsible adults of the democratic society. (Cuban, 2000, p. 16)

Most faculty resent the limited or poor avenues of personal interaction available to them with their students due to instruction given at a distance (Piotrowski & Vidanovich, 2000). In addition, professors find no need to modify how they ordinarily deliver their face-to-face classroom instruction to include distance instruction, particularly as technology is constantly changing (Cuban, 2000) and unpredictable.

Furthermore, instructors who are accustomed to and usually prefer to work independent of their peers, find that in distance education, a collaborative team approach that involves instructional designers, production technicians, and administrative support personnel to develop and deliver courses to be the norm (Olcott, 1996).

Faculty loss of control over their intellectual property is another faculty concern. Instructional material that faculty could ordinarily develop into a text for publication to secure tenure and accrue royalties when posted on the Web for distance instruction may lose rightful ownership (Estabrook, 1999). Often the lack of established policy in regards to copyright issues, course royalties for faculty, privacy issues, marketing procedures of courses, uniform cost structure for classes, and credit transfer are issues that faculty believe institutions need to properly plan (Rockwell et al., 1999).

Betts (1990) found that, among other factors, the increase in workload was one of the most disturbing to faculty. Traditionally, faculty load is measured in terms of contact hours or credit hours taught. Most colleges and universities do not have in place policies that will effectively assess the amount of work involved in preparing a distance course or responding to students electronically (Estabrook, 1999).

Another issue is the availability of time during the initial stages of implementing distance education. Faculty have to spend time learning how to use the new technology and developing the program in addition to the normal responsibilities of teaching and conducting research (Bates, 2000; Rockwell et al., 1999). Faculty cannot afford an increase in professional time commitment (Piotrowski & Vodanovich, 2000).

One of the major barriers to the incorporation of distance instruction is the lack of equitable incentive and compensation structure for faculty (Dillon & Walsh, 1992; Olcott, 1996). The applicability of distance teaching towards promotion and tenure, release time, instructional and administrative support, monetary compensation, teaching load, and training would reduce faculty resistance to participation in technology-based instruction (Dillon & Walsh, 1992; Olcott, 1996; Rockwell et al., 1999). Betts (1998) believed that if distance education had associated with it professional prestige, faculty would feel some sense of being compensated.

Faculty are not in favor of the acquisition of distance education technology before the identification of programs and appropriate pedagogy. The tendency for institutions to invest in technology first and pedagogy or content second causes problems in institutions of higher learning as the primary focus is pedagogy.

Another concern is the effect of distance education on the fundamental components of the academy such as the Carnegie unit, residency requirements, and the guidelines for awarding credit hours. These components of higher education "provide standards that help institutions of higher education control the market while at the same time allowing some controlled forms of exchange between colleges and universities" (Estabrook, 1999, para. 12).

Hanson et al. (1997) believed that evaluations of distance education programs to ensure quality would increase faculty confidence in such programs. Many instructors have doubts as to the quality of the courses and modes of evaluation in comparison with the traditional presentation of course material (Imman & Kerwin, 1999). The often-sporadic means by which courses are offered and the limited control instructors have on students enrolled in the courses are factors considered by faculty as lacking in needed structure. Furthermore, the gradual increase in the use of technology in

grading student quizzes and even essays as part of distance education software causes faculty concern about the validity of such tools (Estabrook, 1999).

The academic freedom of faculty, enjoyed behind the closed doors with their students, alters when faculty teach using technology-based distance education practices. Courses taught by faculty are visible and accessible to peers, administrators, and others outside the regular classroom. Estabrook (1999) believed that this will have a negative effect on academic freedom.

Most faculty need training in the use of different types of technology and instructional design for the purposes of distance instruction delivery. Training and support are of utmost importance to instructional faculty in regards to distance education (Piotrowski & Vodanovich, 2000; Rockwell et al., 1999); however, appropriate and sufficient training is often lacking. Faculty would prefer to learn at their own pace rather than within the limited time available to them when visiting outside trainers give the initial training (Donovan & Macklin, 1999). Faculty also express dissatisfaction at the insufficient "hands-on" training and mentoring workshops provided (Matthew, Parker, & Wilkinson, 1998).

Olcott (1996) stated that technology intimidates some faculty members (George & Camarata, 1996) resulting in technology anxiety, also referred to as "cyberanxiety." Some instructors are afraid of having to change instructional methods. Cybernaxiety also occurs in faculty when training consultants do not respond favorably to the differences in range of faculty computer capabilities (George & Camarata, 1996).

Most technological tools in distance education are relatively new, currently under development, or constantly being updated. As a result, technology-based instruction is often plagued by technological difficulties such as server failure, "dead" links, and overloaded circuits, or new learning, situations faculty find aggravating.

This discussion on faculty concerns about distance education is not meant to give the impression that faculty are totally negative or oblivious to its advantages. For instance, current research revealed that students instructed via technology-based methods perform as well as students taught in the traditional approach in standardized tests but outperform the traditional students in performance assessment type tests in areas such as research and organization of ideas (Dede, 2000).

Universities are keen to facilitate distance education as well as other technology-based instruction and so are looking to practice methods that will enhance its establishment in institutions of higher learning. This includes ensuring the availability of necessary hardware and software, to name a few.

Academic Facilitator: Supporting Faculty

Bates (2000) was of the opinion that the real problem with the implementation of distance education is that most faculty do not have enough technical support. The National Center for Education Statistics (1999) reported that 31% of all the factors that hinder university distance education may be attributed to limited technological infrastructure, second only to program costs. Equipment failures and costs of maintaining equipment come third, making up 23% of the total university distance education hindering factors.

Cuban (2000) demonstrated that appropriate infrastructure and equipment maintenance alone do not incite faculty participation in distance education practices, although the ease of use of technology made it much easier for faculty to engage in technology-based learning now than in the past. Nevertheless, a team of individuals with each member contributing different skills to the development and delivery of distance education under the leadership of one team member would most likely ensure "high-quality cost-effective technology-based" (p. 66) distance education (Bates, 2000). It is the members of such a team that this paper refers to as academic facilitators and includes individuals ranging from the distance education executive director to the distance education technical staff of the institution responsible for technology-based distance education in higher education instruction methods.

Implementation of Distance Education: Higher Education Barriers a Decade into the 21st Century

The prohibitive TBDE factors identified in the latter part of the first decade in the 21st century include: Managerial concerns, non-emergence of anticipated activity theory, non-technology efficacy, no university-wide or school wide technology culture, and an overwhelming sense of keeping up.

Managerial Concerns

According to Sellwyn (2007) the peripheral, limited, or marginalized implementation of TBDE may be due in part to the emerging need for new managerial skills associated with TBDE. Implementing TBDE may require that universities become more entrepreneurial bordering on “academic capitalism” and running more complex organizations, i.e., managing students who are off campus (Sellwyn).

Non-Emergence of Anticipated Activity Theory

The advent of technology projected that "e-learning would transform and disrupt teaching practices in higher education" (Blin & Munro, 2008, p. 4) and concurrently resolve issues of low enrollment, lack in lifelong learning, reduced flexible learning, etc. These preliminary analyses are derived from the "Activity Theory" which postulates that when there is internalization of a "way of thinking" as a result of the use of a tool such as technology then there will be a transformation or development as a result of the interaction (Blin & Munro, 2008). The anticipation of disruption and a surge of e-learning has not been realized and there is little evidence of significant impact on teaching practices (Blin & Munro).

Non-Technology Efficacy

According to Mueller et al (2008) faculty who have tried to use technology-based instruction and have had a negative experience in the process, tend to become unmotivated to use TBDE. Such an experience may lead to or increase faculty members' discomfort with technology (Mueller, et al). Reduced or non-existent self-perception of efficacy in instructional technology is self-prohibiting.

Academic Community Culture

According to Schneckenberg (2009) the lack of a university-wide positive and sustained viewpoint on integrating technology in instruction can also be prohibitive. The lack of faculty interest and engagement for eLearning are visible symptoms for deeply rooted causes, which hinder current innovation efforts of universities (Schneckenberg). An institution's failure to establish long-standing cultural values in the academic community, particularly with the expectation of technology – enhanced innovativeness is one of the current prohibitive TBDE factors.

Overwhelming Sense

With three months, the equivalent of a technological year, institutions and faculty are being bombarded with a range of various technology (Oblinger & Verville, 1997). Faculty and institutions incorrectly feel compelled to use as many technological tools as possible (Christie, M. & Jurado, R.G., 2009), and the overwhelming sense is prohibitive.

Enablers for Overcoming the Barriers to Distance Education

The purpose for indicating prohibitive factors is to enable higher education administrators and faculty to determine ways to overcome the barriers and to increase the potential for a successful implementation of TBDE. Some suggestions for overcoming these barriers and enabling TBDE are discussed in the remainder of this paper.

Cost

Zirkle et.al (2006), suggests that schools that wish to use distance education technology look for external funding sources such as federal or state grants to help with the execution of such programs. Other funding resources can be private foundations, such as the Alfred P. Sloan foundation (Parry, 2009). Another way institutions can save on the cost of distance education is by using open source software, such as Moodle, and by exchanging and sharing online courses, instead of reinventing the wheel (Chen, 2009).

Abeles (2001) suggests modeling experienced international TBDE programs referring to the experience of universities and high schools outside of the United States, e.g., Australia, Canada, and Britain, who have been in this arena for some time and where economic data available indicate the opposite. Twigg (2001) explained the key to cost advantage as employed by international counterparts was "starting with the highest enrollment courses which affect the greatest number of students for the smallest amount of money" (p. 25).

The Sloan Report (Alfred P. Sloan Foundation, 2000; Carr, 2001) concluded with some recommendations for calculating potential distance education program costs. The report suggested that universities take into account estimates of money saved on buildings and land; the expectation that the program will at least break even in its second year; and to consider functioning as a business within the academic culture. This report, the first among its kind, revealed that the universities are hovering close to the break-even point with their distance-learning programs and are at least as cost efficient as producing traditional courses. In conclusion, the universities are not losing great amounts of money in distance education; however, "they are not making much either, at least not yet" (Carr, 2001, para. 3).

Bates (2000) believed in taking another perspective on the cost effectiveness of distance education at institutions of higher learning. Although distance education and other technologies are unlikely to reduce actual costs, they can improve the cost effectiveness of overall operations in higher education. Such subtle benefits (Carr, 2001) include freeing faculty members for more productive use of their time; enabling students to attain existing goals, new skills, and new learning outcomes more easily and quickly; and "enabling institutions to reach out to more and different students" (Bates, 2000, p. 20; Olcott, 1996; Sloman, 2002).

Accessibility and Technical Support

A study of community colleges in Florida revealed that students sometimes have difficulty accessing courses and/or assignments (Haber & Mills, 2008). Accessibility can be increased by openly describing what might go wrong in online learning and what the students can do in each circumstance (e.g., teaching students to "trouble-shoot"). Providing sufficient technical support for faculty and students is extremely important (Haber & Mills, 2008).

Schools that have a support staff in place to help educators with distance education and course development found achieving a successful distance education program was less challenging (Zirkle, 2006). Cho and Berge (2002) stress the importance of maintaining the technical infrastructure. Equipping faculty with more knowledge and confidence through training and review courses creates trust in future opportunities for online learning (Mapuva & Muyengwa, 2009).

Faculty Concerns

Faculty compensation and incentives for developing online courses stands out as the highest-ranked faculty/instructional barrier in several studies. (Picciano, 2001; Schifter, 2000, Zirkle, 2006). These rewards should not be limited to time and financial compensation, but institutions should have existing policies in place that accept and appreciate online teaching in tenure and promotion (Shea, et.al., 2005). Shea recommends a 5-6 month period allocated to the development, design, and execution of each faculty-created online course. Sufficient rewards and enough time to prepare for instruction must be allowed (Cho and Berge, 2002).

Faculty who choose to teach an online course may also need to reevaluate their teaching techniques. Techniques used in traditional courses may have to be modified, as some techniques are not successful in an online environment (Serwatka, 2002). When teaching in an online environment, instructors should modify their courses as they go along. In doing so, the longer a course is taught in a particular format, the more effective it will become (Volery, 2000).

A major factor in overcoming the barrier of faculty concerns is for the instructors to be "involved in all stages on the online course development, including determining the prospective audience, the purpose of the [online] program, and the best format." (Shank, 2002). Some schools have found the use of course templates that encourage sound instructional design to be successful (Shea, 2005). According Brzycki & Dudt (2005) involving faculty in decision-making to secure buy-in encourages the use of faculty models; generates peer support; and potentially well trained student assistants.

Administrative Actions

In order for distance education to be successful, it is crucial that universities have a clear vision of desired results, an understanding of the perceptions and attitudes of current faculty, staff, and students towards distance education, and a clearly defined plan to move from the traditional classroom to online learning. Universities must have flexible organizational structures in order to integrate distance learning courses (Mapuva & Muyengwa, 2009). Research has shown that administrators who want to integrate new technology throughout their institutions have also shown the dedication to provide resources for the implementation of distance learning and pedagogy (Levin & Arefeh, 2002).

The organization of the institution must support the sustainability of distance education. A university-wide strategy and institutional quality standards must be in place. These strategies will need to "implement flexible academic frameworks, innovative pedagogical approaches, new forms of assessments linked to learning outcomes, including eportfolios…… institutional collaboration in development and delivery, and commitment to equivalence of access for students on and off-campus." (MacKeogh & Fox, 2009).

Conclusion

The delineation of the various barriers to TBDE use in higher education provides educational administrators and other faculty insights for an informed approach to resolving the barriers. Prevalent prohibitive factors at the start of the 21st century can be categorized as informational, orientation-related, and personal. Such factors may likely be present in institutions limited in the use or novel to the use of TBDE. The prohibitive factors prevalent ten years into the 21st century can be categorized as managerial, consequential, integration-related, and refinement. Notwithstanding, any of the prohibitive factors may be present, to varying degrees, at all institutions of higher education at any point in time. Consequently, knowledge of barriers past and present is warranted. The enabling suggestions initiate discourse on effective ways to reduce or eliminate certain barriers to implementation of TBDE.

An increase in the implementation of TBDE leads to greater access to higher education. Access to institutions of higher education is of great importance to the institution, individuals, and society. For the institution, increased enrollments in higher education guarantee institutional financial growth and consequently increased educational opportunities for post secondary students. For the individual, a post–secondary education enhances job acquisitions. According to Gladieux and Swail (1999), 70%-90% of current and future jobs require post secondary education. Employment positions held by individuals with post –secondary education results in earnings 50% more on the average than high school graduates over the course of a life time (U. S. Bureau of Census , 1999, 2011). And for society in general, increased earnings by individuals benefits society in several ways as there will be less dependency on government for financial support; enhanced civic life and less civic breaches; increased productivity and community enhancements (Institute of Higher Education Policy, 1998, 2006). It is important therefore for higher education institutional leaders to evaluate their

attitudes toward technological innovations such as TBDE; to keep abreast of related changes pertaining to their institutions; and to consider being more intentional in removing barriers to implementing Technology-Based Distance Education in order to advance the institution, the individuals (both faculty and students) and society as a whole.

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