

DISTANCE LEARNING IN THE 21ST CENTURY UNIVERSITY Key Issues for Leaders and Faculty

Ray J. Amirault

Florida Atlantic University

The changes precipitated by today's computer-based technologies are perhaps no more keenly felt than in the field of education, where technological innovation signals fundamental transformations in the manner in which educational programs will be delivered to 21st century students. Online learning is providing higher education institutions with an entirely new modality for educating learners free from the constraints of time and location, but the transition these institutions must undergo to adapt to online program delivery involves many complex issues, some with ramifications that are not yet fully understood. Distance education leaders and faculty can play an important role in assisting higher education institutions navigate an institution's transition to online education, but in order to fulfill this role, must maintain an ongoing fluency with the issues, including their ramifications, surrounding current technology innovations and their application to online education. This article presents and briefly discusses some of these key issues, and calls for distance education leaders and faculty to maintain an ongoing fluency in the application of technology to online learning so that they may play a meaningful role in shaping the future of higher education.

INTRODUCTION

The higher education landscape has always been shaped by technological innovation, but never so much as it is today. The computer technology revolution that commenced in the middle of the last century has created opportunities for both the delivery of education and its supporting pedagogical techniques that would have been unimaginable even a few decades

ago, but the nature and the scope of this technological revolution has also brought with it unpredictable effects as to how higher education should be conceived in the 21st century. Leaders working in the higher education setting today therefore find themselves at the center of both internal and external dynamic change forces that will significantly impact how education will be delivered, designed, and assessed in the coming years.

• **Ray J. Amirault**, Assistant Professor, Instructional Technology, Department of Teaching and Learning, Florida Atlantic University, ED 47, 319, 777 Glades Road, Boca Raton, FL 33431. E-mail: amirault@fau.edu

The Quarterly Review of Distance Education, Volume 13(4), 2012, pp. 253–265
Copyright © 2012 Information Age Publishing, Inc.

ISSN 1528-3518
All rights of reproduction in any form reserved.

Decisions on how best to harness these new technologies will fall upon the shoulders of distance education and instructional technology leaders, who will continue to be charged with the daunting task of advising and guiding institutions in their technology-enabled education work. Many of these decisions will hold long-reaching implications for individual institutions, and will eventually affect the broader higher education landscape through secondary effects. Faculty members, too, will continue to wrestle with how to best to harness advanced technologies for maximum pedagogical effect in courses and programs, but will also face pressure to constantly revise courses, implement new methodological approaches, and remain in what is essentially a constant state of personal training and skills development. Today's technological innovations certainly promise much advancement for the higher education world, but they also herald a period of unpredictable change for the very institutions that provide that education. This article is designed to highlight some of those changes.

CHANGE AND THE UNIVERSITY

The university has frequently witnessed many significant technology change events in its eight century history, and these technological upheavals have repeatedly forced the institution to adapt in order to maintain its educational relevancy (Amirault & Branson, 2006; Amirault & Visser, 2009). In contrast to its sometimes reputation as an "ivory tower," the university can more correctly be understood as a dynamic and flexible structure that possesses the ability to evolve and to adapt to significant change events. In fact, it is this very characteristic that has permitted the university to retain its place as the world's premier educational institution for over 800 years.

What would have been the fate of the university, for example, had the institution not moved forward with the pioneering exploration of medical techniques by Mondino de Luzzi in the 14th century (Castiglioni, 1941),

and rather left medicine and human physiology to be explored outside the institution? What, too, if the university had refused to allow printed textbooks into its curriculum after the invention of the printing press in the 15th century (Sedlar, 1994), maintaining the medieval view that only hand copied and vellum-based documents were to be employed for classroom¹ use? And what role in mathematics and science would the university have enjoyed in the early 13th century had it rejected Fibonacci's popularization of Arabic numerals for math and science in his *Liber Abaci* (1202)² in favor of maintaining the traditional Roman numeral format (Høystrup, 2007)? There are many other historical examples that could be mentioned, but these exemplars offer evidence that the university has repeatedly faced massive change in the technological landscape, yet has repeatedly been able to adapt itself to remain relevant, even while keeping intact its basic educational model (Amirault, 2012).

In spite of a long and successful history of adapting to technological change, however, the technological innovations of the past half-century have posed a significant organizational challenge to the university, and many higher education organizations continue to grapple with how best to utilize new technologies in fulfilling their educational mission. Interestingly, too, the numerous and varied technological changes being experienced today all stem from two original innovations: the development of the digital computer, and the creation of networked telecommunications technology (Gillies & Cailliau, 2000; Hochheiser, 2008). Both of these innovations occurred in the middle of the 20th century, but the impact of their development was truly felt only as both technologies matured and expanded in the century's last two decades.

The integration of these two technological innovations (digital computers and a worldwide telecommunications network to connect them) has made possible today entirely new methods of educational delivery. As increasingly powerful computers became ever less expensive through mass production techniques

supported by a mass consumer market (Edmonson, 2009), computer-based education became feasible throughout most parts of the world. Connecting these computers through Internet telecommunications technology further extended the educational capabilities of computers, enabling sophisticated and low-cost synchronous and asynchronous e-learning. These capabilities were further enlarged by the proliferation of advanced digital devices built upon these basic components including smart phones, tablet computers, on-demand streaming video, social networking sites, portable digital audio devices, and online content repositories (Saylor, 2012), as well as the enhanced communication protocols connecting them (Clark, 2003).

With the facility to now move courses and entire programs into an “online” digital environment, the higher education world has been presented with options never before witnessed in education, and thereby faces a massive challenge to do so in a manner that keeps intact the institution’s status as the premier educational experience. Some researchers have predicted the end of “brick and mortar” institutions; others have described how they feel the higher education landscape will be changed from the traditional education model. Mazoué (2012), for example, has proposed “the deconstructed campus,” in which he argues that four converging trends (the learning sciences, the wiki-fication of knowledge, the unbundling of faculty roles, and the migration of learning online [Mazoué, p. 74]) will transition higher education away from the location-dependent university campus model.³

The pressure placed upon the university for change is not coming only from the singular effect of technological innovation. Students, too, are increasingly insisting that universities undergo the shift toward online courses and programs. In addition, students, even traditional ones, are also increasingly pressing for the use of state-of-the-art technology in their face-to-face courses, including digital video recording, streaming of lectures, tablet-enabled “smart” rooms, and other computer-

based tools.⁴ This means that today’s institutions are experiencing both external pressures (i.e., the pressure brought about by the development of new technologies) and internal pressures (i.e., the pressure from students pushing for increased use of these technologies) to alter the manner in which higher education is conceived and delivered. These pressures make for an extremely challenging situation for distance education and instructional technology leaders who are attempting to respond to such forces while simultaneously attempting to stay abreast of ongoing technology innovation cycles.

Further complicating the higher education landscape is the manner in which these new technologies are becoming concomitantly entangled with economic issues, particularly in regards to online learning. Questions of costs, savings, opportunity costs, current and future revenue streams, and competition among educational providers have resulted in a complex weave of issues that must be addressed by higher education institutions as they manage the shift toward more extensive online learning. We now highlight some of these issues.

ISSUES SURROUNDING TODAY’S TECHNOLOGY REVOLUTION

Demand Growth for Web-Based Distance Learning Programs and Courses

There is little dispute about the growth of web-based distance education and the increasing demand for such programs (Allen & Seaman, 2007, 2009). The growing number of fully online programs has promised a truly “borderless” educational experience, where a worldwide body of students is essentially free to attend any institution of choice (assuming successful application), and where traditional geographical limitations are removed from the matriculation process. In theory, this means that higher education institutions now exist in a worldwide competitive environment for a

single, global student body pool, something never truly previously experienced in traditional higher education institutions. The ability for students around the world to select from a wide range of online programs signals other changes, as well. The traditional student migration patterns generated by physical matriculation of students to institutions around the world, for example, may be irrevocably changing (Amirault & Visser, 2011). Further, the level of internationalization experienced within student bodies in online programs is also on the path to increase (Amirault & Visser, 2011). Demand for online programs will therefore almost certainly alter the demographic and cultural makeup of higher education student bodies.

Although it is easy to think of the “distance learner” as someone who insists on studying fully online, many students in traditional degree programs also desire the option to take some portion of their courses online. Some reviews have shown, for example, that a significant number of students who study online are actually geographically located close to their institution of study (Allen & Seaman, 2008), and much of this can be attributed to these students currently in traditional programs who wish to also to take a portion of their coursework in online format. It can be seen, therefore, that it is not only international students who are affected by online learning, but also traditional and local students, as well.

Regardless of the geographic location of students, the demand for distance-based education continues to grow (Allen & Seaman, 2011; Sener, 2010). “Early adopter” higher education institutions of online learning (cf. Amirault & Sievert, 2005) have increased the pressures for other educational providers to follow suit, and there are few universities and higher education institutions who have not put at least some portion of their courses online. This does not imply that all online institutions will experience nothing but growth. Recent news about a major private online provider closing 115 locations and letting go some 800 employees (Lewin, 2012) speaks to the bud-

getary complexities that most institutions face. But all higher education institutions, whether they be early or late adopters, are being forced to grapple with the longer term ramifications of online learning which continue to experience overall growth.

Increased Competition From Higher Education Providers

The growth in demand for distance learning programs has generated an entirely new set of competitive interactions between higher education providers. Traditional brick-and-mortar universities have always experienced the self-regulating effects of geographic location on interinstitutional competition, because students have always been required to physically relocate in order to matriculate to a given school. This meant that competition between educational providers, though always innately present in that a segment of students have always applied to multiple institutions, has traditionally enjoyed a built-in limiting mechanism. (A student might find it feasible, for example, to relocate to a university within his or her state, but not necessarily possess the means to relocate to a different state or country in order to study.)

The growth of web-based distance education, however, has essentially eliminated competition factors traditionally associated with school location, and students from nearly any part of the globe are now more widely able to matriculate to any institution of choice. This implies that universities and higher education institutions essentially find themselves in direct competition with other institutions that historically have never held such a relationship. Students who are sufficiently knowledgeable about their options for studying online at higher education institutions may now find themselves at the center of a global competition between institutions for their placement in a higher education program.

In the middle of a growing competitive market for online education, some institutions have bucked the trend by forming partnerships

to offer online courses, often at no charge to students. An example of this is the partnership formed by Harvard University and the Massachusetts Institute of Technology, called edX (Rosen, 2012). edX is set up as a not-for-profit enterprise for online interactive study to transform both online and campus study (edX, 2012). As of December 2012, edX had some half dozen universities in participation, including the University of California, Berkley, the University of Texas, Georgetown University, and Wellesley offering free online courses in computer science, history, statistics, chemistry, and health. An additional example of university online partnership is Coursera, which, as of December 2012, had some 33 top universities from around the world partnering to offer free online courses in an even wider range of topics (Coursera, 2012). The very presence of these partnerships demonstrate that higher education institutions are negotiating significant changes in how a global student body is beginning to view their educational options.

Tuition rates are an additional factor impacting this newly competitive market for online higher education. Because public university tuition levels are set by state legislatures, economic competition for students between institutions is often outside the control of many higher education programs. (Students simply factor the perceived value of a degree from a given institution against the specified cost which that institution charges, and then compare that ratio against other educational options.) Public institutions are frequently unable to therefore impact a key issue that is the basis for most all competition—cost—and must therefore appeal to students in terms of perceived value of the degree, perceived value of the institution, the specific faculty which teach in the program, and similar factors.

Some state universities have brought the issue of flexible tuition rates on a program-by-program basis to their state legislatures in attempt to address this issue (cf. Addo, 2012). For example, if a school's business degree holds a significantly higher return on invest-

ment from the student's point of view (i.e., the salary a typical graduate will earn, the employment opportunities generated by holding the degree, etc.), the institution can charge more for this degree program, and students will enroll based on their earning potential and on institutional prestige. This opportunity to set "market rates" for online programs, however, is simply not an option for many public institutions. Some public schools, however, may be granted the option of doing so (cf. The Florida Senate, 2012), arguably creating artificial imbalances in the economic context of higher education.

Reduction of State Funding for Public Universities

At the same time institutions of higher education have experienced *growth* in enrollment in both distance and traditional programs, the same institutions have also often faced *declines* in the amount of state funding provided by their respective legislatures, including major research universities (National Science Board, 2012). As the economic crisis of 2008 filtered its way through state government budgets, some state legislatures have responded by significantly decreasing the amounts they are willing to allocate to state universities, and either recommend that universities increase tuition (in essence, shifting budget shortfalls to students), or that already cash-strapped institutions make significant cuts to internal operations, including reducing the number of courses offered, increasing course enrollment caps, increasing student fees, or downsizing internal positions and operations.⁵

In such an economic climate, online courses and programs can easily be viewed as a mechanism for increasing institutional revenues. With a much larger potential pool of students, and with the ability to deploy online courses with larger student enrollment caps, the online format indeed may imply higher revenues for institutions already struggling with state bud-

get shortfalls, providing further impetus to grow their distance programs.

Yet the true cost of designing, implementing, maintaining, and revising such programs can remain hidden from early budgetary considerations. A belief that courses can be easily and directly ported from the traditional classroom to the online setting, for example, can overshadow a true understanding of the time, expertise, and work that must be invested to deploy such programs (cf. Morrison & Anglin, 2009). Numerous “hidden” costs, too, are easy to overlook: technical infrastructure costs, software licensing fees, support staff payroll, ongoing instructor training, and more are all part of the online education economic equation, and these factors must be examined as part of the greater decision making process for transitioning higher education programs to partially or fully online modality.

From the student’s point of view, web-based distance learning has the potential to reduce the overall cost of education. The student has no relocation cost, will not necessarily have to exit the job market while attending classes, and will not experience other costs inherent in a campus-based education model (in spite of the presence of additional charges, such as “parking” fees, “technology” fees, etc., that some fully online students are being charged by their university). But from the institution’s point of view, a full understanding of all aspects of the costs entailed with deploying fully online programs must be developed before it is possible to fully understand the economic impact such programs will ultimately have on university economics.

Changes in the Ratio of Full-Time to Adjunct Faculty

Concurrent with the changes precipitated by the increasing availability of online programs and the challenges of state revenue shortfalls, some institutions are significantly altering the number of adjunct faculty teaching positions used to teach courses (Bettinger & Long, 2006). The American Federation of

Teachers reported that, by 2010, adjuncts and/or part-time faculty made up 47% of all faculty in U.S. public colleges, and nearly 70% in community colleges (American Federation of Teachers Higher Education, 2010). In some cases, the increase in the number of adjuncts is simultaneously accompanied by a reduction in the number of tenure-line and full time teaching faculty lines, significantly changing the ratio of full-time to adjunct faculty. As tenure becomes an increasingly threatened part of higher education (cf. Bradley, Brown, & Ferguson, 2011), this change in the overall makeup of university faculty is an extremely important institutional factor that demands careful consideration and review.

Much of this alteration in the makeup of faculty is directly related to the costs, or the perceived costs, of maintaining university programs in today’s difficult economic climate. It can be argued, of course, that the use of online courses taught by adjuncts can reduce an institution’s overall costs. The technology used to support online courses is mature enough, so the argument goes, to allow a wide group of nontechnology specialist adjuncts to teach online courses. With proper planning, too, economies of scale can be achieved by supplying prebuilt, standardized course materials (i.e., syllabi, assignment descriptions, activities, exercises, support content, etc.) to any adjunct assigned to teach the course. With the differential cost of using an adjunct and ready-made instructional content versus full-time or tenured professors with their self-developed instructional materials, it can be argued that the institution enjoys cost savings via this mechanism.

Yet the overall issue of support for the presence of tenured and/or full-time faculty is an important one that extends beyond solely economic concerns (June, 2012). Students have always been attracted to universities and higher education institutions because of the presence of premier faculty (Radding & Clark, 1992), and the reduction of such for mere economic reasons cuts into the essence of what it means to have “a university” (Newman, 1891).

Adjuncts have played, and continue to play, an important role in helping universities deliver their degree programs, and many adjuncts are exceptional scholars and professionals who offer great value to any educational institution. But the trend in the decrease of support for full-time and tenure-line faculty lines is a challenge to the traditional composition of higher education institutions, including newer online programs. And with many institutions directly competing in the fully online arena, a lack of premier faculty delivering educational programs may reduce such competitions to purely economic matters.⁶

Outsourcing of Instructional Content Development

In contradiction to the traditional notion that faculty members are the sole, authoritative source of instructional content to be used within a class, a wide number of private companies now employ content experts, instructional designers, and a variety of technical professionals to create, and then sell, instructional “packages” for use in online university courses. Such content can include readings, assignments, interactive learning tools, quizzes, exams, and even entire “plug-in” courses for use in online learning management systems. The argument for this approach is that much content, particularly in the undergraduate curriculum, consists of basic knowledge well known by the educational community, and that little is to be gained from individual faculty members repeatedly duplicating content across courses and sections year after year. This approach argues that the outsourcing of digital content builds efficiencies, can improve consistency and accuracy in course materials, and frees faculty members to focus on their specific areas of specialization.

The use of externally developed and purchased course content may also be accompanied by the increased use of adjuncts in online programs. As course content becomes highly stable and fully specified, a belief that such content can be delivered as effectively by

adjuncts rather than full-time faculty members can prevail. The end result of this shift is an ever greater number of online programs being moved outside of the domain of full-time faculty. Even with the additional cost of purchasing such ready-made content, this movement may be viewed as an additional method for reducing program costs (through the use of part time adjuncts), while increasing revenue (through the projected enrollment increases generated by online courses).

Although purchasing ready-made instructional content from external educational vendors may hold some clear economic advantages for educational institutions, the approach is not without its issues. Using externally developed content may eventually result in a mentality where courses are treated as no more than facts to be learned, not as rich educational experiences informed by a knowledgeable faculty member with a lifetime specialty in the area. Externally developed content, too, may not reflect what a knowledgeable faculty member believes to be essential components of the learning experience for a given class. And decisions about what content is to be emphasized, and what to be deemphasized, can eventually become removed from the instructor’s purview, dictated more by what external providers feel are the most important aspects of a particular course or learning domain.⁷

Competition Among Learning Management System Providers

As online distance education has grown, the selection of a learning management system (LMS) to deploy online programs at a given institution has become an increasingly important factor, as the majority of all online courses are deployed through some form of LMS (e.g., Blackboard, eCollege, or Desire2Learn). The growing importance of the LMS in online learning has precipitated within the software industry a move to develop even more LMS products (Ellis, 2012), and LMS development is not restricted to only licensed and for-cost

systems. Open licensing freeware systems, such as Moodle, Claroline, OLAT, and others, have also been under development, and there now exists a moderately broad set of LMS platforms on which institutions can deploy online programs.

This decision is not simply a matter of choice between competing features of various LMS platforms. Individual LMS platforms will certainly have particular strengths and weaknesses, as all software systems do, but leaving aside the question of features, functionality and usability, the broader question of whether an institution will select a licensed proprietary LMS, or a free, open-source LMS is also an economic one, particularly as the size of an institution's online programs scale up. And estimating such costs are not as straightforward as it might first sound. Open source LMS systems offer minimal start-up costs, and as these systems have grown in sophistication and reliability, they can also promise environments that rival licensed systems for an extremely small up-front investment. Compare that with licensed and purchased LMS systems, which can be hugely expensive to purchase, must be relicensed on a regular basis, and which may have increase in cost as a factor of the number of enrolled students.

Further confounding the question of licensed vs. free systems is the entry into the LMS market of major software companies such as Google. A recent partnership between Pearson and Google, for example, has produced the "Open Class" LMS, a system which not only provides basic LMS functionality, but also integrates Google's "Tools" suite, as well as social networking and mobile functionality. Such developments in the LMS market may blur the boundary between freeware and licensed systems, creating a "middle option" of lower fee proprietary systems, and may significantly increase overall competition within the LMS market.

Nevertheless, selecting a freeware LMS solution on the basis of sheer economic terms is not as clear-cut a decision as it might first

seem. Although licensing fees for proprietary systems can indeed be large, freeware systems also come with many hidden costs. Freeware systems must be implemented and maintained in-house, resulting in significant infrastructure costs (i.e., servers and networks to house the LMS and make the LMS accessible online). In-house technology must also be maintained, generating significant personnel costs for server and networking technical personnel. In addition, freeware systems often must be customized to meet the needs of a given institution, and these customization features will require in-house programmers and technology experts to implement. Technical support for users, as well as training for the same, also generates significant personnel costs.

Further clouding the LMS selection issue is the potential collection of personal information by an LMS provider. If an LMS is provided at an apparently lower cost than a traditional licensed system, but that system subsequently collects personal student, instructor, and course data as part of its operation, the true economic cost to both the university and to the student is unknown. With no fully understood and agreed-to "monetized" value for personal information, and with the unknowns surrounding the collection and possible reuse of student and faculty information, it is not yet entirely possible to fully understand the actual "cost" of such a system.⁸ This means that, for the university or higher education institution, the issues generated by LMS selection are both larger and more complex than is often realized.

The Rise of Massive Open Online Courses

In the very recent period, the emergence of massive open online courses (MOOCs) have begun to impact on the periphery of distance education programs (Hyman, 2012). MOOCs may be understood best in contrast to the traditional educational paradigm, where students pay for a course, earn credit for the course upon successful completion, take the course with a limited number of students (typically 30

or less), and have exclusive access to the faculty member teaching the course via the formal registration process. MOOCs leverage electronic distance learning technologies (including the Internet, computers, tablet computers, smart phones, and other portable devices) to offer what is essentially the reverse: a virtually unlimited number of students all simultaneously taking a course via online modality, who pay little or nothing for the course, and may earn no traditional formal credit. MOOCs can therefore be viewed as existing in the cross section between distance education and the open source movement, where online technology enables a huge number of distributed, simultaneous participants, and where the information presented is open to anyone wishing to join the sessions without any formal admittance to a traditional degree program or institution. But if no credit is earned, how could such a mechanism impact universities and higher education institutions that are predicated on the notion of student application, formal matriculation, course enrollment, assessment, and degree award?

As part of a philosophy that content knowledge should not be the sole domain of students participating in formal coursework, the presence of MOOCs, regardless of how recent their development, can theoretically impact enrollment and participation in formal university programs. If a student, for example, feels that he or she can learn the knowledge and skills offered in a MOOC, then what would be the need to attend (and pay for) traditional formal education courses? MOOCs can, in contrast, theoretically also positively impact higher education enrollment. If a learner has the opportunity to participate in a little-to-no cost MOOC facilitated by an esteemed professor, then this student may be motivated to take a next step and formally enroll in a university degree program. (This could certainly be the case if a MOOC is offered by a professor teaching in a traditional institution: the learner might come to value the training that can be achieved by studying under such a professor, and therefore be more strongly motivated to enroll in a pro-

gram in which that professor conducts more traditional classes.)

MOOCs represent at a broader level a challenge to traditional institutions in that they offer an additional route to learning outside the formal classroom. MOOCs challenge the traditional notion that information is disseminated and controlled by professors teaching in the traditional classroom by viewing information as public and “open” (deWaard et al., 2011). The philosophy reflected in MOOCs that knowledge and information should be considered free to all takes knowledge and information out of the domain of the formal classroom, and out from the control of the traditional higher education provider. Although it is far too early to understand where MOOCs are heading, they can be viewed as a potential form of competition to higher education programs, particularly to the online format.⁹

CONCLUSION

In this brief article, we have discussed some of the complex issues that have arisen in higher education as a result of the 20th century technology revolution. Although we cannot with great certainty predict how every aspect of higher education will ultimately be altered over the next decades, an examination of these issues can help us identify and prepare for the changes most likely to occur.

The growth and proliferation of online programs certainly signals that a major structural change may be in the offing for higher education institutions. All tiers of educational providers will almost certainly be drawn into this reality. The increased competition between all types of higher educational providers made possible through the mechanism of online and distance education will create imbalances in the system that will be dictated by how groups of students around the world make their educational choices. The makeup of student bodies, particularly those in fully online programs, will change, and international student migration patterns will be affected.

Competition between universities is only one part of the equation surrounding online education, however. It was Niall Ferguson, professor of history at Harvard University, who spoke of a “democratization of study” and “globalization” as two of the major trends transforming higher education (Ferguson, 2007).¹⁰ The online world is indeed “democratizing” education in that it is making access more universally available to all, regardless of location, and the increased content knowledge being disseminated in such an environment removes it from the confines of a single classroom. In a warning that is simultaneously both prescient and also informed by an understanding of the university’s past, Ferguson has described how this set of factors (competition, globalization, and the democratization of education) can easily lead to a new stratification of institutions, as well as significant changes in the relative ranking of premier institutions (Ferguson, p. 24). This trend could significantly alter the higher education landscape in ways that even 50 years ago would have been unimaginable. Some institutions may grow. Others may go out of existence. Almost certainly, the international ranking of institutions will be altered in some way as they move through this change period (cf. Hazelkorn, 2011).

Financial factors will continue to play a major role in how universities shift into a greater online presence. While the endowments of some institutions remain strikingly high, the majority of institutions will not be able to rely on endowment funds, and will need to decide how to implement broader online offerings at costs that can be sustained. Further compounding the financial issues for public institutions is the possible continued reducing in funding from state legislatures. An uncertain economic situation, likely to continue exhibiting significant oscillations, will exert differential pressures on higher education institutions through both direct and follow-on effects.

The university is just now entering its ninth century of existence. It is also arguably facing

the greatest challenges in its long and impressive history. Distance education and educational technology will come to play an increasing role in how the university and higher education at large meets these challenges. But these changes should be controlled and guided, not allowed to randomly run in any direction. Distance education and educational technology leaders are in an excellent position to help leverage this change to the betterment of higher education. Examining and reflecting on the various components of this change situation, as I have attempted to do in some small way here, is an excellent place to start.

NOTES

1. For a fascinating account, including the tension between the printers in the Paris book trade and the University of Paris in medieval France, see the fascinating and scholarly account in *The Printing Press as an Agent of Change* (Eisenstein, 1980). Scholastic university professors wrestled with what they would permit and deny in the age of the scribe, but the geographical proximity of the University of Paris and the Parisian book printers resulted in pressures to adopt printed texts into the curriculum that would eventually prove impossible to resist. Not all responses to technological advances in the university’s history, therefore, were made with open arms.
2. A modern translation in English of Fibonacci’s original text can be found in Sigler (2003).
3. For a detailed review and analysis of Mazoué’s argument, see Anglin’s *Considering the Future of Brick and Mortar Universities* (2012), as well as Shrock’s *A Reaction to Mazoué’s Deconstructed Campus* (2012). For an extensive examination of the interrelationship between “the deconstructed campus” and instructional design, see Ross and Morrison’s *Constructing a Deconstructed Campus: Instructional Design as Vital Bricks and Mortar* (2012).
4. A recent report by EDUCAUSE on the use of high-tech devices by 3,000 undergraduate students (Dahlstrom, deBoor, Grunwald, & Vockley, 2011) found that 87% of students used

laptops, but also found usage for other devices, including: iPods (62%); smartphones (55%); digital cameras (55%); handheld gaming device (38%). The report had a key finding that students hold a “clear preference” for mobile technologies, while still retaining strong use of “traditional” devices (p. 7). These numbers are likely only to go up as advanced and mobile-based technologies continue to proliferate over time.

5. A few institutions have been able to negotiate the financial crisis period by virtue of the size of the endowment funds they possess. Harvard University, for example, is estimated to have some \$32 billion in FY2011, and Stanford, Princeton, and Yale each in excess of \$15 billion (Hopkins, 2012). These cases are exceptions, of course, as most public institutions must wrestle with difficult financial funding issues. But the growing divergence between institutions with massive (and growing) endowments and institutions on the tightest of budgets is a troubling issue worthy of examination.
6. And it can be wondered, too, who might win such a battle. Stated another way, if public universities cannot compete in the realm of distinguished faculty, can they win an economic/cost battle against for-profit educational providers who can leverage cost factors to increase market share? Does the traditional university wish to take on this battle and become simply an economic competitor, or does the university offer something in meaningful value that lies outside strictly economic measures?
7. Course content has historically always been under the control of faculty as far back as the medieval origins of the university. It was the presence of specific wandering scholars taken from the 12th century cathedral schools that essentially launched the university as we know it today. Students were drawn to the University of Paris, the University of Bologna, and Cambridge University beginning in the early 13th century by the reputation of the masters lecturing in these institutions. The University of Paris was renowned for its expertise in theology, Bologna for law, and Cambridge for natural philosophy (Jordan, 2003). Course content was intimately tied to these experts. Moving the loci of course content to external, nonuniversity institutions (such as businesses that develop such content for sale as prepackaged

content) may make economic sense and may also carry with it other advantages, but it certainly is a dramatic change to the foundational assumption that has always been present in university education.

8. A very interesting look at how the European Union is seeking to understand “monetizing” personal information can be seen in the EU’s cyber security organization (cf. European Network and Information Security Agency, 2011).
9. The Stanford professor Sebastian Thrun, who gave up tenure in 2011 at Stanford to cofound *Udacity*, has stated that he believes that in 50 years, only some ten higher education institutions will still remain in existence (“Learning New,” 2012). It is doubtful that Thrun’s prediction will come true, but such claims reflect the uncertainty that surrounds much of higher education as we transition to a more globally competitive, technology-centric, and online educational reality.
10. Although Ferguson (2007) was not directly referencing online education in this work, Ferguson’s themes are directly connected with the nature of character of most online education. His brief work, which describes how elite universities have changed in relative ranking over time, and the role endowments can play in maintaining a university’s status, is an important one for anyone wishing to understand the changes occurring in today’s higher education landscape.

REFERENCES

- 2012 Florida Statutes, 1009 C.F.R. § 24 (2012).
- Addo, K. (2012). La. colleges, universities seek flexible tuition. *The Advocate*. Retrieved from <http://theadvocate.com/home/4379070-125/colleges-universities-seek-flexible-tuition>
- Allen, I. E., & Seaman, J. (2007). *Online nation: Five years of growing on online learning*. Needham, MA: The Sloan Consortium.
- Allen, I. E., & Seaman, J. (2008). *Staying the course: Online education in the United States, 2008*. Needham, MA: The Sloan Consortium.
- Allen, I. E., & Seaman, J. (2009). *Learning on demand: Online education in the United States, 2009*. Needham, MA: The Sloan Consortium.
- Allen, I. E., & Seaman, J. (2011). *Going the distance: Online education in the United States, 2011*. Needham, MA: The Sloan Consortium.

- American Federation of Teachers Higher Education. (2010). *American academic: A national survey of part-time/adjunct faculty* (Vol. 2, pp. 1-15).
- Amirault, R. J. (2012). Will distance education permanently alter the historic course of the university? In L. Visser, Y. L. Visser, R. J. Amirault & M. Simonson (Eds.), *Trends and issues in distance education: International perspectives* (2nd ed.). Greenwich, CT: Information Age.
- Amirault, R. J., & Branson, R. K. (2006). Educators and expertise: A brief history of theories and models. In K. A. Ericsson, N. Charness, P. J. Feltoovich & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 69-86). New York, NY: Cambridge University Press.
- Amirault, R. J., & Sievert, J. (2005). Implementing a distance learning program: An interview with Robert M. Morgan. In Y. L. Visser, L. Visser, M. Simonson & R. J. Amirault (Eds.), *Trends and issues in distance education: International perspectives* (1st ed.). Greenwich, CT: Information Age.
- Amirault, R. J., & Visser, Y. L. (2009). The university in periods of technological change: A historically grounded perspective. *The Journal of Computing in Higher Education*, 21(1), 62-79.
- Amirault, R. J., & Visser, Y. L. (2011). The impact of e-learning programs on the internationalization of the university. In F. Columbus (Ed.), *Higher education: Teaching, internationalization, and student issues*. Hauppauge, NY: Nova Science.
- Anglin, G. J. (2012). Considering the future of brick and mortar universities. *The Journal of Computing in Higher Education*, 24(2), 71-73.
- Bettinger, E. P., & Long, B. T. (2006). The increasing use of adjunct instructors at public institutions: Are we hurting students? In R. G. Ehrenberg (Ed.), *What's happening to public higher education?: The shifting financial burden*. Baltimore, MD: The Johns Hopkins University Press.
- Bradley, G., Brown, G. S., & Ferguson, M. (2011). Crisis in public higher education. *Academe*, 97(3), 4-7.
- Castiglioni, A. (1941). *A history of medicine*. New York, NY: Knopf.
- Clark, M. P. (2003). *Data networks, IP, and the Internet: protocols, design, and operation*. Hoboken, NJ: Wiley.
- Coursera. (2012). About Coursera. Retrieved from <https://http://www.coursera.org/about>
- Dahlstrom, E., deBoor, T., Grunwald, P., & Vockley, M. (2011). *The ECAR National Study of Undergraduate Students and Information Technology, 2011*. Boulder, CO: EDUCAUSE Center for Applied Research.
- deWaard, I., Abajian, S., Gallagher, M. S., Hogue, R., Keskin, N., & Koutropoulos, A. (2011). Using mLearning and MOOCs to understand chaos, emergence, and complexity in education. *The International Review of Research in Open and Distance Learning*, 12(7), 94-115. Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/1046/2026>
- Edmonson, N. (2009). *Technological foundations of cyclical economic growth: The case of the United States economy*. New Brunswick, NJ: Transaction and Rutgers University.
- edX. (2012). About edX. Retrieved from <https://http://www.edx.org/about>
- Eisenstein, E. L. (1980). *The printing press as an agent of change*. New York, NY: Cambridge University Press.
- Ellis, R. K. (2012). Spending on LMS will grow to more than \$1.8 billion in 2013. *Technology Trends November 2012*. Retrieved from <http://www.astd.org/Publications/Newsletters/Learning-Circuits/Learning-Circuits-Archives/2012/11/Technology-Trends-November-2012>
- European Network and Information Security Agency. (2011). *Study on monetizing privacy: An economic model for pricing personal information* (2011/S 95-154875). Heraklion, Greece: European Union.
- Ferguson, N. (2007). Empires of education: The rise and fall of great universities. *Forum for the Future of Higher Education*, 21-24. Retrieved from <http://net.educause.edu/ir/library/pdf/ff0705s.pdf>
- Gillies, J., & Cailliau, R. (2000). *How the Web was born: The story of the World Wide Web*. Oxford, England: Oxford University Press.
- Hazelkorn, E. (2011). *Rankings and the reshaping of higher education: The battle for world-class excellence*. Houndmills Basingstoke, England: Palgrave Macmillan.
- Hochheiser, S. (2008). Transistors and the computer revolution Retrieved from http://www.ieeeeghn.org/wiki/index.php/Transistors_and_the_Computer_Revolution
- Hopkins, K. (2012). 10 colleges with largest financial endowments. Retrieved from <http://>

- www.usnews.com/education/best-colleges/the-short-list-college/articles/2012/11/27/10-colleges-with-largest-financial-endowments
- Høyrup, J. (2007). *Jacopo da Firenze's Tractatus Algorismi and early Italian abacus culture* (Vol. XII). Basel, Switzerland: Springer.
- Hyman, P. (2012). In the year of disruptive education. *Communications of the ACM*, 55(12), 20-22.
- Jordan, W. C. (2003). *Europe in the high middle ages* (Vol. 3). New York, NY: Penguin Putnam.
- June, A. W. (2012, November 5). Adjuncts build strength in numbers: The new majority generates a shift in academic culture. *The Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/Adjuncts-Build-Strength-in/135520/>
- Learning new lessons. (2012). *The Economist*, 405, 101.
- Lewin, T. (2012, October 17). University of Phoenix to shutter 115 locations. *The New York Times*. Retrieved from http://www.nytimes.com/2012/10/18/education/university-of-phoenix-to-close-115-locations.html?_r=0
- Mazoué, J. (2012). The deconstructed campus. *Journal of Computing in Higher Education*, 24(2), 74-95. doi:10.1007/s12528-012-9054-2
- Morrison, G. R., & Anglin, G. (2009). An instructional design approach for effective shovelware: Modifying materials for distance education. In A. Orellana, T. L. Hudgins, & M. R. Simonson (Eds.), *The perfect online course: best practices for designing and teaching*. Charlotte, NC: Information Age.
- National Science Board. (2012). Diminishing funding and rising expectations: Trends and challenges for public research universities *Science and Engineering Indicators, 2012*. Arlington, VA: National Science Foundation.
- Newman, J. H. (1891). *The idea of a university*. London, England: Longmans, Green.
- Radding, C. M., & Clark, W. W. (1992). *Medieval architecture, medieval learning*. New Haven, CT: Yale University Press.
- Rosen, R. J. (2012). The single biggest change in education since the printing press. *The Atlantic* Retrieved from <http://www.theatlantic.com/technology/archive/2012/05/the-single-biggest-change-in-education-since-the-printing-press/256655/>
- Ross, S. M., & Morrison, G. R. (2012). Constructing a deconstructed campus: Instructional design as vital bricks and mortar. *The Journal of Computing in Higher Education*, 24(2), 119-131.
- Saylor, M. (2012). *The mobile wave: How mobile intelligence will change everything*. New York, NY: Vanguard .
- Sedlar, J. w. (1994). *East central Europe in the middle ages: 1000-1500*. Seattle, WA: University of Washington Press.
- Sener, J. (2010). Why online education will attain full scale [Report]. *Journal of Asynchronous Learning Networks*, 14(4), 3-16.
- Shrock, S. A. (2012). A reaction to Mazoué's deconstructed campus. *The Journal of Computing in Higher Education*, 24(2), 104-118.
- Sigler, L. (2003). *Fibonacci's Liber Abaci*. New York, NY: Springer.

