Development of an E-Education Framework

"John" Jin H. Im
Department of Management
Sacred Heart University
5151 Park Ave.
Fairfield , CT 06825
203-396-8233
imj@sacredheart.edu

Abstract

Internet technologies blur the distinction between distance learning and traditional learning by enabling the convergence of these two, thus causing confusion in widely-accepted definitions, terminologies, concepts, and theories on distance learning. This paper introduces an e-education framework with three reference models in order to reduce the confusion caused by the traditional distance learning framework; to map newly emerging learning modes; and to explore new and innovative education models.

Introduction

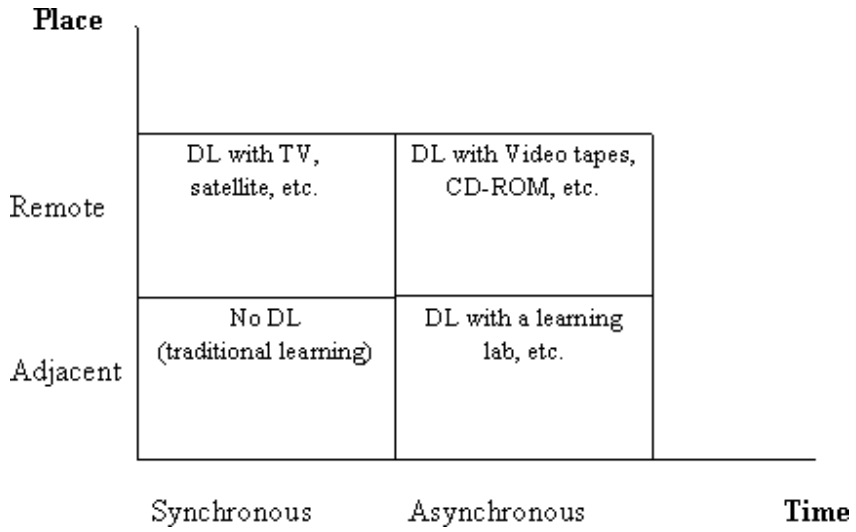
The history of distance learning goes back more than a century when correspondence study started (Moore et al., 1996, p.19; Simonson et al., 2000, p.22). Keegan (1986) defined distance learning as a distinct form of education, parallel and complement to traditional face-to-face learning. The American Association of University Professors (1998, p. 32) provided a traditional definition of distance learning: " T he process whereby the education of a student occurs in circumstances where the educator and the student are geographically separated, and the communication across this distance is accomplished by one or more forms of technology."

The distinction between distance learning and traditional learning had been clear until recently. However, Internet technologies blur the distinction by enabling the convergence of these two, thus causing confusion in widely-accepted definitions, terminologies, concepts, and theories on distance learning. This paper introduces a theoretical framework of e-education with several reference models in order to reduce the confusion caused by the traditional distance learning framework; to map newly emerging learning modes; and to explore new and innovative education models.

1.1 Distance learning framework

Coldeway (1986) specified time and place as two variables in the learning process. Each of these variables provides two distinct learning modes: adjacent vs. remote in terms of place and synchronous vs. asynchronous in terms of time. Figure 1 shows Coldeway's two-dimensional distance learning model where four distinct learning modes are identified.

Figure 1. Coldeway's Distance Learning Model



Among the four quadrants in Figure 1, the bottom-left one represents the traditional learning mode which has no barriers in terms of time and place, thus requiring all students to be in a fixed place at a fixed time for face-to-face learning . Pure distance learning occurs in the top-right quadrant where learning is done asynchronous at a remote place. Distance learning is largely selected by non-traditional, adult students who have constraints imposed by time and place due to distance from campus, work schedules, family responsibilities, military duties, disabilities, etc. There are two additional quadrants where only one of the two constraints exists. The top-left quadrant has the constraint of place, thus synchronous learning can be performed remotely through a broadcasting system, a closed-circuit TV system, or a satellite system. The constraint of time applies in the bottom-right quadrant, where asynchronous learning occurs at a fixed place such as a learning lab. Though two kinds of such hybrid learning are available, the pure mode is dominant in distance learning.

The early form of distance learning was termed ‘correspondence learning' where content deliveries consisted of mainly prints, audiotapes, or videotapes. Subsequently, an array of communication technologies has been used to connect students to their instructors efficiently and effectively in distance learning. S ixteen different delivery modes are listed in the distance learning Web site, http://www.vccs.edu/vccsonline/directoryindex.html, of The Virginia Community College System (VCCS). At this site, a student searches a distance learning course by keyword (subject area), by college, by category, by term, and by delivery mode. Among the five search criteria, delivery mode is the only one that distinguishes a distance learning course from a traditional one. The seventeen delivery media are World Wide Web, Compressed Video, Videotapes, Tele-course, E-Mail, CD-ROM, Print-based, Desktop Video, IP/TV, Computer-aided Instruction, Satellite – Analog, Satellite – Digital, PBS broadcast video, AudioGraphics, Voicemail, Classroom Lecture, and Other distance learning mode. Most of these sixteen are remnants of the early distance learning era before the advent of the Internet. The Internet became the dominant delivery mode in a relatively short period of time due to its unmatchable advantages over other delivery methods in terms of ease of use, accessibility, flexibility, and affordability. Internet-based courses at the North Carolina Community Systems (Yim, 2005) accounted for 78% of the total FTE (Full time equivalent) enrollment for distance learning in 2003-2004, while other courses such as tele-courses and two-way video-based ones made up only 15%, a decline by half from 29% in 2001-2002. Furthermore, new types of courses such as blended ones, which require some class meetings, jumped up to 7% from the meager 2% in two years.

1.2 Confusion with the traditional framework

Thanks to the development of new technologies, a variety of distance learning modes have evolved over the past decade. There are two approaches to accommodate newly emerging modes. One approach is to revise the definition of distance learning and the other one is to coin a new term. Simonson et al. (2000, pp.20-22) explained how earlier researchers redefined distance learning on an as-needed basis. This one-size-fits-all approach worked well when there were few variations. As the definition is continually refined and redefined, however, it results in confusion due to lack of a widely accepted common definition. Depending on a person's perception and experience, usage of the term varies, making comparison difficult. Mason (1999) raised his concern regarding the lack of a common term by saying "The mystification surrounding the term 'online course' arises because it is used indiscriminately to apply to nearly any course which makes even a passing use of the Internet, as well as to those where every aspect of the course is only accessible electronically." Thus, explicit declaration of which definition is used should be made beforehand for common understanding, such as Maguire's (2005) statement "For the purpose of this review distance education will refer only to this asynchronous, web-based, online format." However, this approach is troublesome since it counteracts the purpose of having a definition to use a common language with standardized terms. Furthermore, existing definitions and theories on distance learning may become obsolete, confusing, and detrimental.

Considering the shortcomings of the first approach, the second approach of coining a new term for a variation in distance learning seems more appropriate. The eLearners.com's distance learning glossary (eLearners.com) lists thirteen similar terms: Computer Based Training, Correspondence Course, Distance Education **,** Distance Learning, Distance Training , Distributed Learning, e-Learning , Instructor-led Training , Online Learning , Online Training, Synchronous Learning, and Web Based Training. However, proliferation of similar terms such as those causes an additional confusion with overlapping and conflicting meanings. Without a standardized glossary, there is great difficulty in ensuring that people agree upon what different terms mean. For instance, it is hard to distinguish the two interchangeable terms, online and distance education, in Arnone's (2002) statement that "… few teach via distance education, and even fewer teach online." A Masie Center 's poll (Carnevale, 2001) that had presented people with fifteen different terms and phrases found that "Other than e-learning, few terms seem to be widely used by people who offer the courses." Rather than distinguishing one term from another, people often use them interchangeably for convenience like Cappel et al. (2004, p.49) by declaring " Today, many writers use the terms 'e-learning,' 'online learning,' and 'web-based learning' interchangeably, and that approach will be taken in this paper." There is a dilemma regarding how to define a new learning mode since neither of the two approaches work well. Saba (2002) claimed that this was not a definitional problem, but rather a conceptual confusion in distance education by stating that " This confusion, in part, is the result of new terms, which have brought into discourse about distance education, and have received uncritical acceptance by us …. We are in this difficult conceptual state of affairs, because of a lack of interest in the theoretical development of the field."

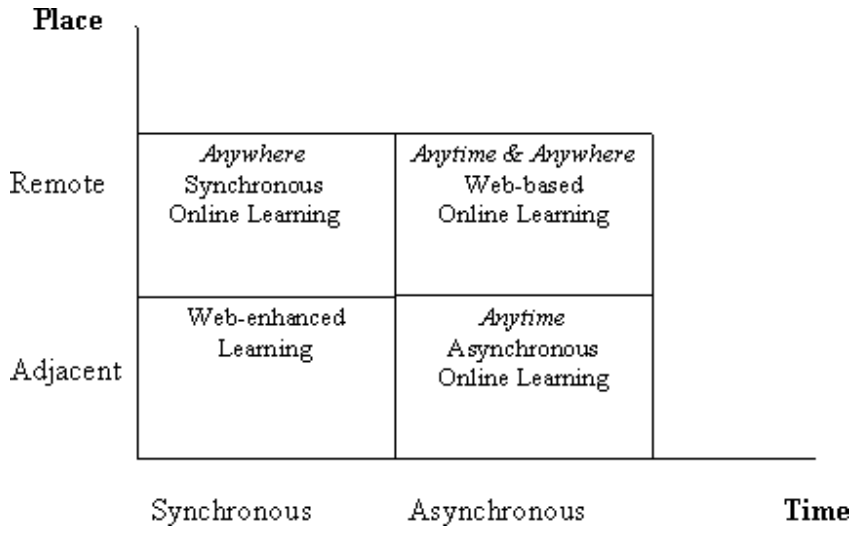
2 E-education framework

2.1 Online learning model

Unlike other technologies adopted for distance learning, the Internet serves as a disruptive technology by opening up a new horizon not just for distance learning but for learning as a whole. The term 'online' refers to the ability to connect to a computer network for immediate interaction. First available to the public in mid-1990s, the Internet serves as a global network. Interactive capability of the Internet enables instructors and students to communicate in real time and allows

learning processes to be guided and measured instantaneously and continually. It allows online learning anytime and anywhere by loosening the constraints of time and place. Though the term ‘online learning' is often used interchangeably with distance learning, the scope of the former becomes much larger than that of the latter, thus making the latter a subset of the former. For instance, a course management system such as Blackboard enables the online learning mode not just for distance learning but for traditional learning thus breaking the traditional barrier between the two (Dunn, 2000) . Accordingly, Coldeway's two-dimensional model of distance learning should be revised to present online learning in terms of four distinct modes: Web-based, Web-enabled, synchronous, and asynchronous, as shown in Figure 2.

Figure 2. Online Learning Model



In this model, there is no difference between a distance learning course and a Web-based online course in terms of course format. The only distinction is based upon target audience: (1) distance learning students only, (2) resident students only, or (3) both. The time and place constraints separate learning from teaching in distance education as indicated by Wedemeyer (Simonson et al., 2000 , p p .28-29). L earner independence results in learner autonomy, addressed by Moore (Simonson et al., 2000, p p .29-30). Thus, successful distance education focuses on student-centered learning with an emphasis on learning over teaching. Rumble (2001, p.36) stated “Even in a traditional ‘face-to-face' system, students spend much of their time working on their own. It may always have been so, but the increase in resources for individual learning and especially those through the new technologies has provided students with far more powerful tools for independent learning.” By taking online courses, resident students can take advantage of independent learning and learner autonomy.

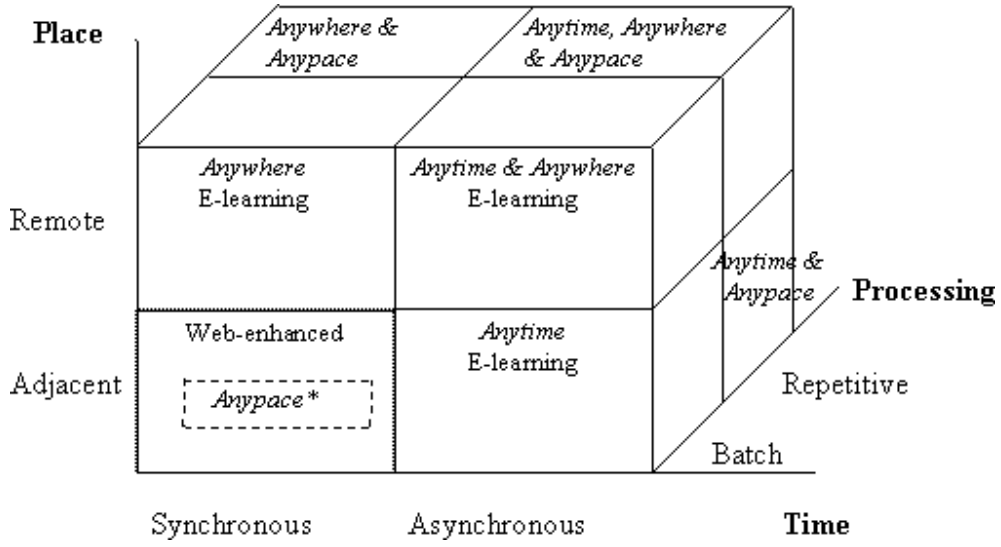
The Internet may be used to remove the constraint of place almost completely through the use of a virtual classroom. The Singapore-MIT Alliance (http://web.mit.edu/sma) delivers class sessions via the Internet between MIT and two universities in Singapore in a synchronous manner. However, synchronous delivery of course materials is still technically difficult to provide and very expensive. But there are more cost effective ways to take advantage of synchronous modes via the Internet, as demonstrated with synchronous discussion in a virtual classroom, chatting, etc. Therefore, it is

possible to deliver portions of a course synchronously while the remainder is delivered in another mode. The same is true in asynchronous delivery of course content. For example, video recordings of lectures are available online at Baruch's School of Business so that students may review them later asynchronously (Olsen, 2003).

2.2 E-learning model

Business organizations have changed their production/service mode from batch processing with a large lot size to repetitive or so-called ‘just-in-time' processing with a small lot size in order to achieve mass customization over mass production. Mass customization provides customized products or services in order to meet individual needs of customers, yet at mass production prices (Anderson , 2004). It is common that learning is done in a batch mode through a semester or a quarter. A repetitive learning mode can be possible in education as the National Association of State Boards of Education (NASBE, 2001, p.13) envisioned “learning on a 2 4 /7 basis and throughout the year, not artificial schedules and calendars.” Many corporate e-learning opportunities are already offered for self-paced and just-for-me learning at a lower cost (Bartholomew, 2005; Beck et al., 2004; Huang et al., 2006; Chong et al., 2004). Since the two-dimensional online model cannot accommodate this type of anypace learning, a three-dimensional e-learning model is needed with a new dimension, ‘processing,' as shown in Figure 3.

Figure 3. E-Learning Model



* For the hidden block behind the Web-enhanced mode.

In this e-learning model, learning evolves into eight distinct modes. To move from a batch learning mode to a repetitive one, two things should be addressed. First, fixed costs for learning should be reduced substantially so that a smaller class size of a course may be offered repetitively. The ideal size of a class would be one student similar to the lot-size one or lot-less production sought by business organizations. Second, the time span in a repetitive learning mode should be much shorter than a traditional one, so that Just-in-time learning can be possible. The University of Phoenix offers

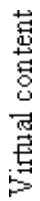
5-week long courses for undergraduates, and 6-week long ones for graduates with an average class size of 13 students (Vilic, 2004). The Rio Salado College in Arizona has twenty six class-start dates per year to allow a student to take a course in less than two weeks of waiting at maximum, thus eliminating traditional semesters (Thor, 2006). A much shorter, individualized learning session is common in non-credit certificate courses and in job-specific practical training courses.

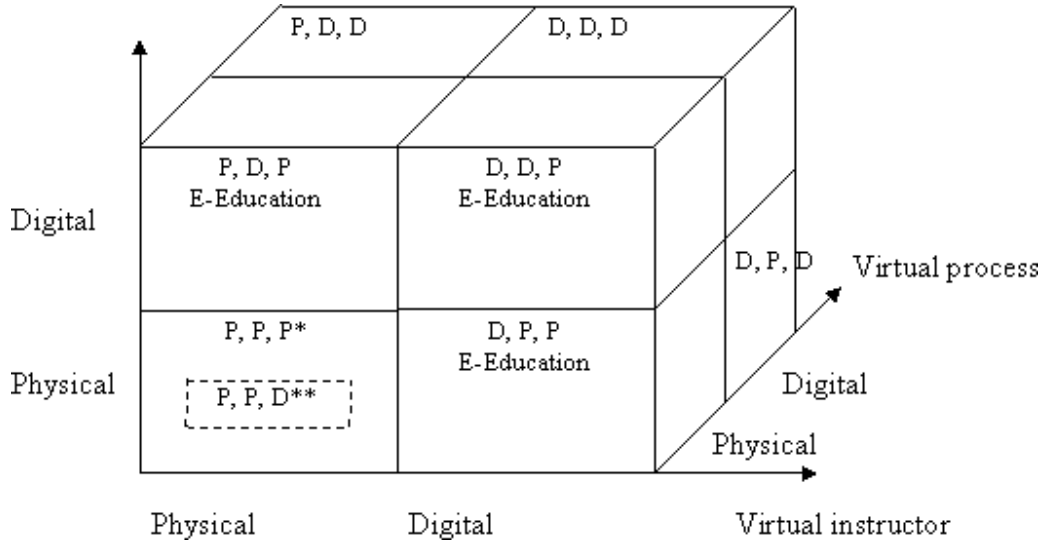
2.3 E-education model

In a business market, there are three major components: (1) agents (or players), (2) products or services, (3) processes. Education is a service market where instructors provide the service of education to students as customers. Wedemeyer pointed out three components in every teaching-learning situation: (1) a teacher and a learner or learners as agents, (2) a communications system or mode as a learning process, and (3) something to be taught or learned as service (Simonson et al., p.29). In traditional learning, the quality of education is measured from the instructor's perspective in terms of teaching. However, distance learning emphasizes the learner's perspective, thus focusing on the quality of learning since learning is separated from teaching. The most significant contribution of online learning and e-learning is to carry this student-centered learning perspective in distance learning to all the other learning modes. However, t he common limitation of all three previous learning models is that they focus on the process only. Since all today's computers are digital, information should be in a digital form for input, processing, storage, transmission, and output. While the term ‘online' emphasizes the status of network connectivity, ‘e-‘ focuses on the signal format used in a network after connection. New e-learning technologies affect not only the process but also the agent/instructor and the service/learning in education.

The education sector can learn from the business sector since e-commerce is far ahead of the e-learning. Whinston et al. (1997) explained various e-commerce areas with a three-dimensional model where each of the three market components represents a single dimension. They called the core of e-commerce a “fully-digital business” where all three components are digital (or virtual): (1) digital agents, (2) digital products, and (3) digital process in comparison with traditional commerce where all components are physical. For instance, a customer who visits the Amazon.com website, searches for, downloads and pays for an e-book with an automated transaction and payment system. In this example, the whole transaction of buying the digital product is processed digitally by a virtual agent. The same can be done in education. When the National Association of State Boards of Education (NASBE, 2001) set four goals of e-learning as “Any Time, Any Place, Any Path, Any Pace,” the e-learning model in Figure 3 can accommodate all but “Any Path” since it explains various e-learning modes based on the process only. Today's students grow up digitally with laptops, broadband speed, wireless connectivity, cellular phones, TiVo, DVR, iPods, etc. Increasingly, more and more contents become digitized and are made available through digital agents. Therefore, another model is needed to accommodate all three components in education, as shown below.

Figure 4. E-Education Model





*Indicates physical content via a physical delivery medium by a physical (human) instructor.

** For the hidden block behind the 'P, P, P'.

In the e-education model, the area marked with 'P, P, P' represents traditional education where students receive education as service from an instructor in a face-to-face learning mode with physical materials such as books, transparencies, chalkboards, etc while the area with 'D, D, D' encompasses the core of e-education as a "fully-digital education" where students learn digitally from a digital (or virtual) instructor using digital materials such as ebooks, self-paced exercises, multi-media-based simulations, etc. The Duke University's iPod experiment with freshmen falls in the 'P, D, D' mode where a student may download digital contents such as lecture notes, music, audios, videos posted or 'podcasted' by his/her instructor (Calhoun, 2005).

3 Conclusion

The conventional dichotomy of distance learning and traditional learning fades out since they are no longer considered to be parallel learning modes in e-learning. Digital technologies allow all e-learning modes to encompass certain features of distance learning, resulting in the convergence of once distinct learning modes (Tait et al., 1999; Thompson, 1999). Traditional distance learning played a marginal role in education like the mail ordering business. E-commerce transforms the mail ordering business model from a marginal player to the business mainstream (Tsang, 2006). The same is true for e-education. The early failure of e-learning can be mainly attributed to the adoption of a technology-driven approach to automate existing learning processes rather than a pedagogy-driven approach to redesign courses.

Ever increasing ICT-related costs have partially contributed to the hike in college tuitions in recent years. ICT-related costs are typically treated as overhead in education like earlier days in business because they are not for revenue generation or cost saving but for quality improvement. Like business organizations, it is time for educational institutions to think of using ICT strategically as an enabler of reengineering effort with an ROI-based e-education model. E-education may be treated as a cost center to focus on cost savings or a profit center to increase revenue (Boettcher, 2005). An educational institution may move toward e-education either reactively or proactively depending on how stake holders, particularly faculty, embrace such changes (Bates, 2000; Maguire, 2005; Zemsky

et al., 2004). The real challenge is how to respond to such changes in the education environment with strategic innovation by exploring new ideas and models (Drejer, 2006). School administrators and faculty may use the proposed e-education framework as a mapping tool to proceed through the uncharted territory ahead when developing and implementing strategies for e-education.

References

American Association of University Professors . (1998). Distance Learning . *Academe* . May-June .

Anderson , D.M. (2004). MASS CUSTOMIZATION, the Proactive Management of Variety. http://www.build-to-order-consulting.com/mc.htm

Arnone, M. (2002). Many students' favorite professors shun distance education. The Chronicle of Higher Education. 5/10/2002. p.A39.

Bartholomew, D. (2005). Taking the e-training. Industry Week. 254(6). June. p.34-37.

Bates, A.W. (2000). Distance education in dual mode higher education institutions: Challenges and Changes. http://bates.cstudies.ubc.ca

Calhoun, T. (2005, June 23). Bravo for the Duke iPod Experiment. Campus Technology.

Cappel, J.J. and Hayen, R.L. (2004). Evaluating E-Learning: A Case Study. J of Computer Information Systems, 44(4). pp.49-56

Carnevale, D. (2001). It's Education Online. It's Someplace You Aren't. What's It Called? The Chronicle of Higher Education. 47(18). January 12. A33.

Drejer, A. (2006) 'Strategic innovation: can we learn something by applying a learning perspective?', *Int. J. of Innovation and Learning* , Vol. 3, No. 2, pp.144-160.

Dunn, S. (2000 March/April) The virtualizing of education. The Futurist. 34(2): 34-38.

eLearners.com. (2005). Distance Learning Glossary. http://www.elearners.com/resources/glossary.asp

Keegan, D. (1986). The foundations of distance education, London : Croom Helm.

Maguire, LL. (2005, Spring). Literature Review – Faculty participation in online distance education: barriers and motivators. Online J of Distance Learning Administration . 8(1).

Mason, R (1999). Models of Online Courses. ALN Magazine, 2(2). Oct 1999. http://www.aln.org/publications/magazine/v2n2/mason.asp

Moore , M. & Kearsley, G. (1996). Distance Education: A Systems View. Wadsworth Publishing.

National Association of State Boards of Education (NASBE). (2001). Any Time, Any Place, Any Path, Any Pace: Taking the Lead on e-Learning Policy.

Olsen, F. (2003), Business School Records Lectures and Lets Students Review them online, The Chronicle of Higher Education, 49(48). 8/8/2003. p.A28.

Rumble, G. (2001). Re-inventing distance education, 1971-2001. International Journal of Lifelong Education. 20(1/2): 31-43.

Saba , F. (2002). The Year Ahead: “Conceptual Confusion” in Distance Education. Distance-Education.Com's Daily News. 9/3/2002. http://www.distance-educator.com/dnews/modules.php?op=modload&name=News&file=article&sid=7412

Simonson, M., Smaldino, S., Albright, M. & Zvacek, S. (2000). Teaching and Learning at a Distance: Foundations of Distance Learning. Upper Saddle River , New Jersey : Merrill.

Tait, A. & Mills, R. (1999). The convergence of distance and conventional education: patterns of flexibility for the individual learner. In ‘The convergence of distance and conventional education: patterns of flexibility for the individual learner' edited by Tait. A & Mills R, Routledge.

Thompson, D. (1999). From marginal to mainstream: critical issues in the adoption of information technologies for tertiary teaching and learning. In ‘The convergence of distance and conventional education: patterns of flexibility for the individual learner' edited by Tait. A & Mills R, Routledge.

Thor, L.M. (2006). Bringing the Best of Business Strategies to Higher Education, EDUCAUSE Review, 41(5), pp.10-11.

Tsang, P. (2006). ‘Harnessing the internet as a virtual lab', Int. J. Innovation and Learning, Vol. 3, No. 6, pp.575-592.

Vilic, B. (July 1, 2004) Online Course Caps: A Survey, Campus Technology. http://campus-technology.com/print.asp?ID=9679.

Whinston, A; Stahl, D. & Choi, S. (1997). The Economics of Electronic Commerce. Macmillan Technical Publishing. Indiana .

Yim, Soyoung. (2005, May 23). Data Trends and Briefings. North Carolina Community College System (NCCCS).. Available at http://www.nccommunitycolleges.edu/Planning/Research/DTB_May23_2005_.pdf

Zemsky, R. & Massy, W.F. (2004). Thwarted Innovation: What Happened to e-Learning and Why. The Learning Alliance for Higher Education.
