AN EXPLORATORY MODEL OF E-EDUCATION

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Abstract: The Internet opens up a new horizon not just for distance learning but for learning as a whole. It blurs the once clear distinction between the distance learning and the traditional learning since it is not another medium for distance but becomes a universal one for the whole learning. Thus, the Internet-based learning needs a new term, e-learning, since the term distance learning is no longer appropriate for this new learning environment. This paper presents an exploratory model of education in view of confusion of terms and definitions based on the old paradigm of distance learning. Furthermore, this model will contribute to clarification of newly emerging learning modes and potential of totally reengineered learning modes based on a new paradigm – e-education.

1 INTRODUCTION

The history of distance learning goes well back when correspondence study started more than a century ago (Moore, et al., 1996, p.19; Simonson, et al., 2000, p.22). Distance learning has been evolving by adopting new technologies to improve learning. Nonetheless, the distinction between distance learning and traditional learning had been very clear up until recently. Unlike other technologies, however, the Internet is making the distinction blur by enabling merger of these two, thus causing confusion on widely-accepted terminologies, concepts, and theories. This paper attempts to develop a reference model which reduces such confusion based on the old paradigm of distance learning; and clarifies newly emerging learning modes and potential of totally reengineered learning modes based on a new paradigm.

A learning mode is largely determined by two factors, space and time. The traditional face-to-face learning requires all students to be in a certain place at a certain time. Distance learning (DL) is used as a complementary alternative when one of those two constraints or both can't be met. Thus, distance learning is largely taken by non-traditional students who have difficulty to meet those constraints due to distant locations, work schedules, family responsibilities, military duties, disabilities, etc. As far as the space factor is concerned, there are two learning modes: adjacent vs. remote. While traditional learning requires students to be in an adjacent place together – typically a classroom at a campus, distance learning can be done remotely, thus allowing a student to select any place at his/her choice. In the time factor, there are also two distinctive learning modes, synchronous vs. asynchronous. Traditional learning is synchronous while distance learning is typically asynchronous. Of course, distance learning can be done synchronously by using a closed circuit TV system or a satellite broadcasting system. The asynchronous mode allows distance learning to be done any time at a student's choice. Figure 1 shows a two-dimensional taxonomy for distance learning based on space and time.

In the above taxonomy, there are three distance learning modes: anywhere, anytime, and anytime & anytime. The term *distance learning* reflects the anywhere aspect in the space dimension while the term *online learning* does the anytime aspect in the time dimension. The term *online learning* indicates
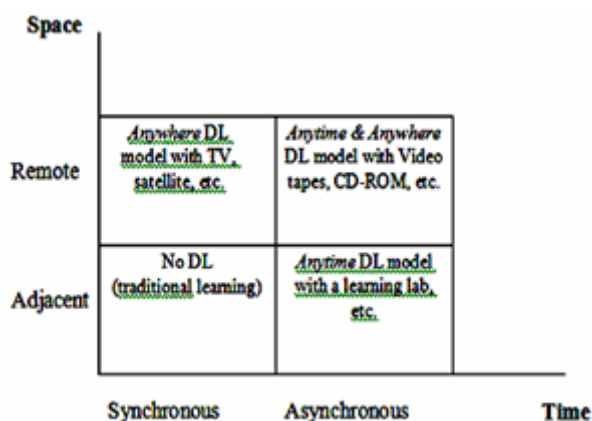
Figure 1: Taxonomy of Traditional Distance Learning

learning through a telecommunication system where a learner is required to be connected. However, *online learning* is widely used interchangeably with *distance learning* since various telecommunication technologies such as a closed-circuit TV system and a satellite broadcasting system are mostly used for distance learning purpose. Though these two terms are widely used interchangeably, they also may be used differently. For instance, distance learning can be done in an anywhere mode where students can be in any place but in a synchronous manner, thus not online learning. On the other end, online learning can be done in an anytime mode where learning can be done any time at a student's choice but at an adjacent place like a computer lab. Since online learning doesn't necessarily mean remote learning, *online distance learning* is a more precise term for distance learning through an online mode. However, distance learning is typically done in an anytime & anywhere mode. The term *distance learning* is usually used in a broad sense to describe any non-traditional learning where an adjacent and synchronous mode is not required. There are other equivalent terms used to describe non-traditional learning in general or a particular variation.

A new technology is adopted for content delivery in distance learning when it can release one of those constraints, time and space, or both in traditional learning. An array of delivery media have been used in distance learning. The mailing system was used to deliver learning contents in prints, audiotapes, or videotapes. That was the early type of distance learning called *correspondence learning*. Subsequently, various new technologies for computers and telecommunications have been added as new media for efficient and effective delivery. For instance, there are sixteen different media are listed to choose under the delivery mode category at the distance learning Web site, http://www.vccs.edu/vccsonline/directoryindex.html, at The Virginia Community College System (VCCS). At the 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, the delivery mode is the only one that distinguishes a distance learning course from a traditional one. The sixteen delivery media are World Wide Web, Compressed Video, Videotapes, Telecourse, 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 those sixteen are remnants of the early distance learning era before the advent of the
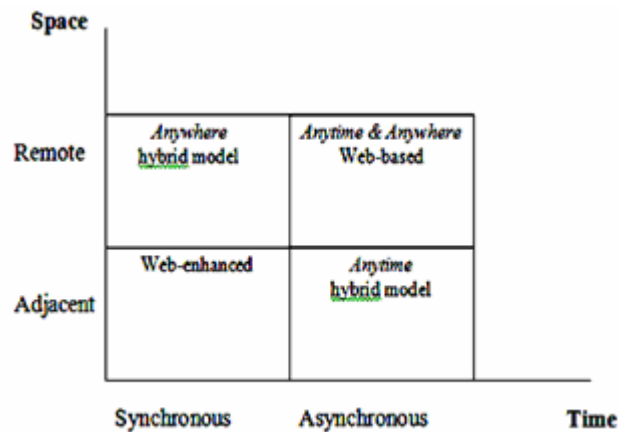
Figure 2: Two Dimensional Taxonomy of e-Learning

Internet. Already, the World Wide Web mode becomes the dominant one among those sixteen modes, of which most except for the classroom lecture will be soon stopped offering, thus disappearing. The classroom lecture mode is widely called a hybrid or blended mode since it requires some classroom meetings. The mode bridges once two mutually exclusive learning modes, thus putting the traditional learning on one end and the distance learning on the other end in a continuum.

2 E-EDUCATION MODEL

Distance learning had played a marginal role mainly for non-traditional working adult education up until late 1990s when the Internet started being widely available to the public. The Internet started being used as another delivery medium for distance learning. It becomes a dominant DL mode in a short time of period in view of its unmatchable advantages over the other existing DL delivery media in terms of ease of use, accessibility, flexibility, affordability, etc. For instance, it can be used in any of those three distinctive DL modes: anytime, anywhere, and anytime & anywhere. The Internet has been replacing once independently existed various distance learning modes with one integrated mode in the name of *Web-based learning* where a Web browser is used to have access to learning contents over the Internet. Nowadays DL modes can be classified into two: Web-based vs. non-Web-based and soon into only one, Web-based, since most of non-Web based ones will disappear or become ignorable albeit used for some special purposes.

Unlike other technologies adopted for distance learning, the Internet opens up a new horizon not just for distance learning but for learning as a whole. It blurs the once clear distinction between the distance learning and the traditional learning since it is not another medium for distance but becomes a universal one for the whole learning. Thus, the Internet-based learning needs a new term, e-learning, since the term distance learning is no longer appropriate for this new learning environment. In e-learning, distance learning is not a distinctive learning mode but become a part of it at one end of the e-learning continuum. Since the old taxonomy of distance learning is based on dichotomy between distance learning and traditional learning, it should be revised to accommodate e-learning, as shown in Figure 2. In this taxonomy, the Web-enhanced model is to enhance the traditional learning with the Internet.
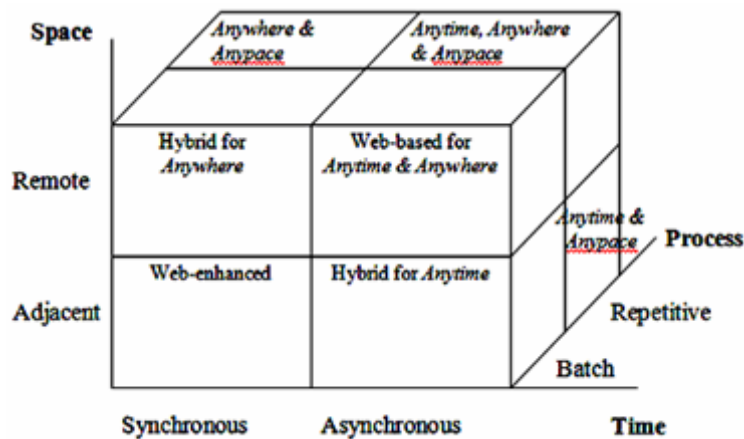
Figure 3: Three Dimensional Taxonomy of e-Learning

Largely there are two ways to enhance a classroom-based course. In the beginning, the Internet was mainly used for out-class purposes such as emailing and posting of course materials like lecture notes, assignments, articles, and other references at a course web site. As more classrooms become Internet ready though wired or wireless networks, the Internet has been used more aggressively for in-class purposes such as course materials presentation, instant access to relevant information, simulations, and streaming video watching. The Web-based model is similar to the anytime & anywhere DL. However there is a big difference between these two since the former is not just for non-traditional students unlike the latter but for any student. For instance, an on-campus student may take a Web-based course. Colleges start offering Web-based versions of their regular courses designed not only for their distance learning students but also for their traditional students. Some courses are offered two different modes in tandem or alternatively so that a student has a choice between a Web-based course and a Web-enhanced one. Advocates argue that such move may result in cost reduction and alleviate shortage of classrooms. Some colleges require their regular students to take at least one Web-based course to get exposed to this new mode of learning. On the other hand, some colleges restrict their regular students from taking their Web-based courses with a concern of possible cannibal effect that a student may take a Web-based course in lieu of a classroom-based course in his/her dormitory room. Many researchers claim that there is not much difference in terms of quality between a traditional course and a DL course with various empirical studies. If that is the case, there is not much reason why a traditional student is not allowed to select a learning mode at his/her choice.

It is not quite feasible to have a hybrid model in non-Web-based distance learning because of incompatibility of underlying technologies. However, since the Internet technology is used as an integrating foundation for all learning models in e-learning, various hybrid models are possible. For instance, the Singapore-MIT Alliance (http://web.mit.edu/sma) offers courses to students at the Massachusetts Institute of Technology and at the two universities, National University of Singapore and Nanyang Technology University, in Singapore. A class session is digitized and delivered in both synchronous and asynchronous modes. Two e-learning models are available to an MIT student: a Web-enhanced one if he/she takes a course in synchronous mode at an MIT classroom and an anytime hybrid one at any place at his/her choice in asynchronous mode. Also, two e-learning models are available to a Singapore student: an anywhere hybrid model if he/she takes it in a classroom and a Web-based one if he/she takes it at any place. Furthermore, the Internet technology makes it easy to deliver major components of a course in different modes. For instance, a weekly quiz for a course may be done in an anytime & anywhere mode. Cyber discussion at a discussion board may be done in an anytime mode. Online chatting at a virtual classroom may be done in an anywhere mode while the remainders are done in a Web-enhanced mode.

In addition to space and time, process is another constraint in learning. There are two distinctive kinds of process in learning, batch vs. repetitive. A batch process mode means that students enroll in a course simultaneously and complete it in a batch during a certain set period of time while a repetitive process mode allows a student to enroll and complete it individually without a set duration. Most college courses are offered in a batch mode with some exceptions like independent study or

mentoring courses. The reason why a batch mode is dominant is its economy of scale. The larger a batch size is, the more economical a course is. Of course, a smaller batch size will contribute to quality of a course with more attention to each student's needs. In the manufacturing industry, mass customization has been replacing mass production as a process strategy in an effort to satisfy a customer's needs on an individual basis while containing cost at an affordable level. Mass customization in learning may be possible in a repetitive process mode thanks to the Internet technology. For instance, a computer literacy course may be designed based on major modules, of which a student is allowed to complete individually a computer literacy course with fully computerized modules which can be taken independently in an anytime, anywhere & anypace mode. Figure 3 shows a three dimensional taxonomy of e-learning including the process constraint. In this taxonomy, there are eight distinctive learning modes: the Web-enhanced one on one end and anytime, anywhere & anypace one on the other end. A course where students are not enough for a batch can be done in a repetitive mode.

3 SUMMARY

This paper presents an exploratory model of education in view of confusion of terms and definitions based on the old paradigm of distance learning. Furthermore, this model will contribute to clarification of newly emerging learning modes and potential of totally reengineered learning modes based on a new paradigm – e-education.

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