The Evolution of Distance Education

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Educational programs in which students and the instructor are separated by place and often time are currently the fastest growing form of instruction both in the United States and throughout the world (Gunawardena & McIsaac, 2004). This is commonly known as distance education, and even though it may currently be viewed as innovative, distance education dates back to the early 1800s (Verduin & Clark, 1991). To a great extent, the evolution of distance education has paralleled advancements in technology, but its development is also a reflection of changing educational values and philosophies. This article has three purposes: to describe the growth of distance education over the past 2 centuries; to identify factors which have facilitated this growth; and to identify emerging conceptual orientations in distance education thinking.

Over the years, many terms have been used to describe distance education. These include distance learning, open learning, networked learning, flexible learning, distributed learning, independent study, learning in connected space and, today, on-line learning is common. However, distance education (by any name) is generally recognized as a structured learning experience that can be engaged in away from an academic institution, at home or at a workplace, and can lead to degrees or credentials (Gunawardena & McIsaac, 2004; Simonson, Smaldino, Albright, & Zvacek, 2000).

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Early Forms of Distance Education

Distance Education via Correspondence

The first generation of distance education was print-based correspondence study, and print continued to be the predominant delivery medium for distance education until the beginning of the 1970s (Garrison & Shale, 1987). In preindustrial Europe, education had been available primarily to males in higher levels of society but, in the 1800s, with the event of the first correspondence program, the doors of education slowly opened to the rest of the population. For example, an advertisement in an 1833 Swedish newspaper touted the opportunity to study "Composition through the medium of the Post" (Bratt, as cited in Verduin & Clark, 1991, p. 15). In 1840, England's newly established Penny Post allowed Isaac Pitman to offer shorthand instruction via correspondence. Three years later, instruction was formalized with the

founding of the Phonographic Correspondence Society, the precursor of Sir Isaac Pitman's Correspondence Colleges (Dinsdale, as cited in Verduin & Clark, 1991). In 1886, H.S. Hermod, of Sweden, began teaching English by correspondence, which led to the founding of Hermod's in 1898, one of the worlds largest and most influential distance teaching organizations. Distance education flourished in Britain in the late 1800s with the founding of a number of correspondence institutions, including Skerry's College in Edinburgh in 1878, and the University Correspondence College in London in 1887 (Curzon, 1977).

This movement ultimately made its way across the ocean to the United States. Correspondence study was integral to the University of Chicago which, in 1890, created a university extension as one of five divisions, the first such division in an American university. The extension division was divided into five departments: lecture study, class study, correspondence teaching, library, and training. The correspondence study department was successful in terms of student enrollment; each year 125 instructors taught 3,000 students enrolled in 350 courses (Rumble, 1986).

In 1891, Thomas J. Foster, editor of the *Morning Herald*, a daily newspaper in eastern Pennsylvania, began offering a correspondence course in mining and the prevention of mine accidents. His business developed into the International Correspondence Schools, a commercial school whose enrollment exploded from 225,000 in 1900 to more than 2 million in 1920 (Simonson et al., 2000).

In the late 1800s, Anna Eliot Ticknor founded a Boston-based society to encourage study at home, which attracted more than 10,000 students in 24 years. Most of these students were women for whom traditional education opportunities were limited. They corresponded monthly with teachers, who offered guided readings and frequent tests (Aggasiz, 1972). William Rainey Harper's (1890) correspondence study, an alternative to traditional education, was designed to provide educational opportunities for those who were not among the economic elite and who could not afford full time residence at an educational institution. Many saw it as simply a business operation, and viewed this alternative as inferior education. Moreover, these distance opportunities extended education potentially to the masses, an extreme departure from the undemocratic educational system that characterized the early years of U. S. history.

However, the need to provide equal access to educational opportunities was the cornerstone of educational democratic ideals, so correspondence study took a new turn (Gunawardena & McIsaac, 2004). The French Ministry of Education set up a government correspondence college as a reaction to the Second World War and the need to train new soldiers while continuing to educate those who may not have been able to come to one location. In addition, Le Centre National d'Enseignement par Correspondences was established to educate children, although it has since become a distance teaching organization for adult education. The goal of these programs was to widen learners' intellectual horizons, as well as provide the chance to improve and update professional knowledge. It allowed individuals the flexibility of learning in their own time and place (Simonson et al., 2000).

Distance Education and Early Technologies

With the invention of the spark transmitter by Guglielmo Marconi in 1894, communication throughout the world changed forever. Marconi's "Black Box" was patented and the first Wireless Telegraph and Signal Company formed in 1897. By the early 1920s, at least 176 radio stations were constructed at educational institutions, although most were gone by the end of the decade (Simonson et al., 2000). Although rarely used in the United States today, in many developing nations radio is still the primary means of distance education. An example of this is a program in Nepal, "enter-educate," a serial radio soap opera broadcast which uses an innovative format of drama and call-in interactive education with radio as its delivery medium (Story, Boulay, Karki, Heckert, & Karmacharya, 1999). It is in these developing countries that radio programming has been used innovatively to either support or supplement print based materials or to carry the majority of the course content.

Educational television teaching programs were produced at the University of Iowa's W9XK between 1932 and 1937 (Koenig & Hill, 1967). However, it was not until the 1950s that college credit courses were offered via broadcast television. Western Reserve University was the first to offer a continuous series of such courses in 1951, and Sunrise Semester was a well-known televised series of college courses offered by New York University on CBS from 1957 to 1982

In the 1960s, satellite television was introduced and this, in turn, enabled the rapid spread of instructional television. The following decade federally funded experiments in the United States and Canada, such as the Appalachian Education Satellite Project (1974-1975), demonstrated the feasibility of satellite-delivered instruction. The first state educational satellite system, Learn/Alaska, was created in 1980 and offered 6 hours of instructional television daily to 100

villages, some of which were only accessible by air. TI-IN Network, a privately operated network in San Antonio, Texas, has delivered a wide variety of courses via satellite to high schools across the United States since 1985 (Simonson et al., 2000).

During World War II, Signal Corps Captain John Mullin found Magneto phones at Radio Frankfurt in Germany and 1,000-meter reels of 6.5mm ferric-coated BASF tape with a 20-min capacity. He mailed two machines to the United States with 50 reels of tape, and after the war worked on them to improve the electronics (Mullin, 1979). At the same time, Paul Klipsch patented the Klipschorn folded horn speaker. The innovations in speakers and amplifiers and tape recorders after World War II contributed to the birth of a "Hi Fi" era that produced stereo and transistor radios and cassette tape players (Augspurger, 1985).

Today, audio and video cassettes have been largely replaced with CDs and DVDs. These devices still afford learners control over the material because they have the flexibility of determining where they learn, at home or at work (Gunawardena & McIsaac, 2004). This cost-effective medium has been used to supplement print and other media, and it can provide valuable resource materials for distance learners.

Modern Forms of Distance Education

Two-Way Synchronous Communication

In recent times, a widely used form of technology-based distance education used a live two-way audio connection. This facilitated synchronous learning environments in which message senders and receivers could communicate with one another at the same time, even though they were separated by distance. This technology was then expanded by incorporating electronic methods of sending graphical information (Simonson et al., 2000). This form of direct, live communication between the instructor and the learner uses television, both open-broadcast and cable, and interactive instructional television (ITV). At one time, using live television to broadcast courses was one of the most popular forms for delivering distance education in U.S. organizations. When state governments in the Unites State began to establish statewide distance education networks, interactive television systems (ITV) became a popular medium in state educational systems as well. ITV can transmit either two-way video and two-way audio or one-way video and two-way audio to several distance locations (Gunawardena & McIsaac, 2004). The British Open University and other international universities also use interactive broadcast television extensively to deliver programming to a large number of distant learners.

Computer-Supported and Online Learning

Computer-supported learning, the fastest-growing form of distance education today, incorporates numerous advances in technology. Although credit and noncredit courses have been offered over computer networks since the mid-1980s (Ackermann, 1995), the development of laptop computers, personal digital assistants (PDAs), CD-ROMs, DVDs, and the World Wide Web provide learners with numerous learning environments. In addition, these technologies give instructors the opportunity to act as learning facilitators, rather than simply suppliers of information. Laptop computers give learners the ability to carry text-based information and to communicate with other learners and instructors throughout the world through the World Wide Web. PDAs are handheld microprocessors that provide all of the advantages of a laptop computer but are smaller and less expensive and are able to work with computers or alone to assist learners in accessing numerous types of information and records. CD-ROMs allow learners the opportunity to access large audio and digital files on a personal computer and are quickly replacing previous generations of audio and video technology.

Factors That Facilitate the Growth of Distance Education

The Impact of Profit-Making Incentives

Higher education is going through a number of changes as a result of advancements in computer technology. One impact of developments in technology is a significant rise in institutions offering online flexible learning opportunities. The Internet has created a new level of competition to higher education with the entry of for-profit online universities that are competing with traditional educational institutions offering alternatives to classroom-based instruction. Educational institutions are responding by offering online versions of some traditional campus-based programs and in some cases creating virtual campuses to complement their traditional "brick and mortar" campuses (Shaik, 2005). Colleges and universities are also turning to for-profit companies to create for-profit subsidiaries to deliver distance education (Bleak, 2002). Additionally, institutions are collaborating to

offer joint online programs and are engaged in a variety of joint business ventures with for-profit organizations that have provided courseware, hardware, and other support services. The long-term success of these different entrants into the online distance education market, however, is unclear and will depend on how the various providers of online education are viewed by learners, the variety of educational communities, professional organizations, and the public at large.

The Impact of Government

Coinciding with the rapid rise of technology, a wide variety of information is now available to U.S. citizens. Correspondingly, the U.S. government has begun to study the effects of this technology on education on a national level. The bipartisan Web-based Education Commission, created in 1998, was charged with studying how the Internet can be used in education at all levels, including prekindergarten to job retraining. This commission specifically focused on what barriers may be slowing the spread of Internet use. The commission's report, "The Power of the Internet for Learning" (2000) recommends that online-learning become a centerpiece in the nation's education policy.

The House Education and Workforce Committee and the Subcommittee on 21st Century Competitiveness approved H.R. 1992, a bill to expand Internet learning opportunities in higher education. The Internet Equity and Education Act of 2001, which has yet to pass, would repeal the rule that requires schools to provide at least 50% of their instruction in person, and the "12-hour" rule that requires students to spend at least 12 hours per week in class during a traditional semester. In addition, this bill would allow students to use federal loans to pay for a college education delivered entirely over the Internet making it the first step toward making the Web-based Education Commission's recommendations a reality (Gunawardena & McIsaac, 2004).

Emerging DE Conceptual Orientations

There is a growing knowledge base encompassing the area of distance education, specifically in the areas of independence and autonomy, and interaction and communication. The development of these lines of thinking continues to impact distance education practice, especially with respect to the use of technology.

Independence and Autonomy

Charles Wedemeyer (1977, 1983) viewed the essence of distance education as the independence of the student, preferring the term independent study versus distance education at the university level. Wedemeyer emphasized learner independence and adoption of technology as a way to implement that independence. He maintained that the separation of teaching from learning was a way of breaking education's "space-time barriers" and noted four elements of every teaching-learning situation: a teacher, a learner or learners, a communications system or mode, and something to be taught or learned. Wedemeyer proposed the reorganization of these elements to allow greater learner freedom. The success of distance education for Wedemeyer was the development of the student and teacher relationship.

Following this tradition, Moore (1994) argues that in most school settings learners are dependent on the teacher; the teacher is active, and the students are passive. In a distance education environment, on the other hand, because there is a physical gap between the teacher and students, students must accept a higher degree of responsibility for their learning. Therefore, autonomous learners need less help from the teacher. Moore classifies distance education programs as being either autonomous (learner-determined) or non-autonomous" (teacher-determined). The degree of autonomy in a given program is determined by who selects the learning objectives, resource persons, and media, and who makes the decisions about learner performance evaluation.

Interaction and Communication

In 1985, Borje Holmberg (1985) identified key assumptions underlying distance education. He believed that the core of teaching is interaction and emotional involvement. Moreover, Holmberg maintained that a personal relationship between the teacher and the learner contribute to learner pleasure and subsequently supports learner motivation. The student's ability to make learning decisions not only facilitates the learning process, but student motivation as well. The depth of the students' learning, in turn, demonstrates teaching effectiveness. In 1995 Holmberg extended his analysis of this process by asserting that the independence fostered by students' freedom of choice in distance education programs can make an important contribution to their continuing as life-long learners (Holmberg, 1995).

Moore (1989) identified three types of interaction in distance education: learner-content interaction, in which learners interact with the content; learner-learner interaction, in which learners interact with fel-

low learners exchanging information and ideas about the course; and learner-instructor interaction, in which the instructor provides feedback and motivation to the learners. Learner-instructor interaction is necessary for many educators and important in learner application of new knowledge. A fourth component of Moore's model of interaction was added by Hillman, Willis, and Gunawardena (1994); learner-interface interaction, which focuses on the interaction between the learner and the technology that delivers instruction.

The continuing development of these ideas will ultimately impact the all forms of distance education, including the use of distance education hardware and its interface with the learners.

Conclusions

Distance education has evolved for almost 200 years and will continue to progress to meet the needs of societies both in the United States and abroad. It holds out the promise of bringing education to a dispersed global population, and it can also provide education to those constrained by the demands of daily life. The evolution of this phenomenon, as well as its future growth, will undoubtedly be shaped to a great extent by technological advancements and refinements. These innovations, however, must be matched by research and theoretical explorations of those DE methods that promote not only student engagement in the learning process, but an inquisitive, skilled and intellectually-able population.

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