January 2004

The Evolution of Distance Education: Bridging the Gap between Teacher and Students

Theresa Zeigler

University of Northern Iowa

Copyright ©2004 Theresa Zeigler
Follow this and additional works at: https://scholarworks.uni.edu/grp

Part of the Curriculum and Instruction Commons

Recommended Citation
Zeigler, Theresa, "The Evolution of Distance Education: Bridging the Gap between Teacher and Students" (2004). Graduate Research Papers. 1567.
https://scholarworks.uni.edu/grp/1567

This Open Access Graduate Research Paper is brought to you for free and open access by the Student Work at UNI ScholarWorks. It has been accepted for inclusion in Graduate Research Papers by an authorized administrator of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.
The Evolution of Distance Education: Bridging the Gap between Teacher and Students

Abstract
Distance learning has been present in our educational society for numerous years, but has evolved more rapidly and attention has been focused more intently during the past two decades. The advancements in technology have allowed for distance learning to reach beyond the traditional boundaries and deliver instruction to learners in diverse locations at time that are convenient to their needs. The recent trend in the increased number of courses available via television and the Internet demonstrates the need for asynchronous learning opportunities for students. However, historical studies in the area of distance education have not always focused on student learning and outcomes, but rather compared the traditional face-to-face instruction to distance education. Areas such as educational communities, individualized learning, humanization, and teacher-student relationships are becoming the new focal point of recent studies. This paper will cover the historical view of the development of distance education and discuss the current issues surrounding course development and delivery of online and telecommunication courses.

This open access graduate research paper is available at UNI ScholarWorks: https://scholarworks.uni.edu/grp/1567
The Evolution of Distance Education:
Bridging the Gap between Teacher and Students

A Graduate Review Paper
Submitted to the
Department of Curriculum and Instruction
In Partial Fulfillment
Of the Requirements for the Degree
Masters of Arts in Education
UNIVERSITY OF NORTHERN IOWA

by
Theresa Zeigler
December, 2004
This Review Paper by: Theresa Zeigler

Titled:

The Evolution of Distance Education
Bridging the Gap Between Teacher and Students

Has been approved as meeting the research requirements for the Degree of Masters of Arts.

1/10/05
Date Approved

Leigh E. Zeitz
Graduate Faculty Reader

1/10/05
Date Approved

Terri McDonald
Graduate Faculty Reader

1/12/05
Date Approved

Greg P. Stefanich
Head, Department of
Curriculum & Instruction
# TABLE OF CONTENTS

Introduction ............................................................................................................. 1

Methodology ........................................................................................................... 5

Discussion and Analysis.......................................................................................... 7
  History............................................................................................................... 7
  Educational Telecommunications ..................................................................... 10
  Computers and the Internet .......................................................................... 18
  Teacher and Learner ....................................................................................... 23

Conclusion and Recommendations ....................................................................... 37

References............................................................................................................. 40
ABSTRACT

Distance learning has been present in our educational society for numerous years, but has evolved more rapidly and attention has been focused more intently during the past two decades. The advancements in technology have allowed for distance learning to reach beyond the traditional boundaries and deliver instruction to learners in diverse locations at time that are convenient to their needs. The recent trend in the increased number of courses available via television and the Internet demonstrates the need for asynchronous learning opportunities for students.

However, historical studies in the area of distance education have not always focused on student learning and outcomes, but rather compared the traditional face-to-face instruction to distance education. Areas such as educational communities, individualized learning, humanization, and teacher-student relationships are becoming the new focal point of recent studies. This paper will cover the historical view of the development of distance education and discuss the current issues surrounding course development and delivery of online and telecommunication courses.
INTRODUCTION

The evolution of distance education has been a series of mountains and valleys and twisted turns that have challenged educators for decades. It has faced many problems concerning implementation and acceptance of educational innovations throughout its history. Distance education has often been considered a 'questionable' or even an 'inferior' form of education (Lever-Duffy, Lemke, Johnson, 1996). Although this attitude may still surface in our educational society today, many have now embraced it as an important concept in mainstream education.

The term, "distance education" or "distance learning" has traditionally been used to define a variety of nontraditional programs. Courses offered in such formats as correspondence, television, radio, and Internet have all been considered forms of distance education. Although many definitions of distance education can be found, most agree that it is a form of education in which there is a separation between teacher and learner and that some form of technology, (e.g., the printed or written word, the telephone, radio, television, computers or teleconferencing) is used to bridge the physical gap (Mugridge, 1991). The Higher Learning Commission defines distance education in its Guidelines for Distance Education, as "a formal educational process in which the majority of the instruction occurs when student and instructor are not in the same place."

Distance education may employ correspondence study, audio, video, or computer

The evolution of distance education has been influenced by the technology available and the demand for instruction for flexible schedules. The primary focus of distance education to offer instruction anytime and anywhere has stayed constant throughout its evolution. Distance education programs strive to produce the same outcomes as traditional courses but the difference is that in distance education the focus has been on bringing the instruction to the students rather than the students to the instruction (Lever-Duffy, Lemke, Johnson, 1996). Although the goal of distance education has remained constant since its inception, there have been significant changes in the technology, structure and composition.

There is a wide variety of factors that affect the delivery of education and student learning. It was once believed that the instructor was responsible for the delivery of education, and the student was responsible for the actual learning. This placed the instructor in the position of possessing all knowledge and delivering this knowledge to students. However, it is understood today that knowledge can be gained from the instructor as well as through fellow students sharing the responsibility of the entire educational process. By building a sense of ownership for the course and the learning that is occurring, students will be more active in their learning process and ultimately be more engaged in the course (Saba & Shearer, 1994).
Distance education has also been categorized into two different formats; synchronous and asynchronous delivery. Synchronous instruction refers to simultaneous participation of student and instructor, a live two-way communication. The students and instructor are required to be present at the same time via some form of communication system. The advantage to this type of delivery is that the interaction is done in "real time" and interaction is immediate. Synchronous courses are usually transmitted over video networks, satellite downlinks, and audio graphic systems. Instructors and students may talk over an audio/video system or in an online chatroom to participate in lecture and discussion activities (Midkiff & DaSilva, 2000).

Asynchronous instruction differs from synchronous instruction in that it does not require the student and teacher to interact in the course at the same time. Participants in the course may choose their own time to be active in class, take part in discussion groups, do assignments or exams, or gather learning materials. Asynchronous distance learning classes have traditionally been identified as correspondence courses and prerecorded video classes. Both of these examples rely on materials that are mailed directly to students and are limited in the amount of interaction. The availability of the Internet and online courses has brought new life to asynchronous learning. Materials are delivered quickly and easily via the web with specific due dates for class activities or exams. This type of instruction
provides more flexibility than synchronous instruction and allows students to attend class according to their schedules (Midkiff & DaSilva, 2000).

Regardless of the delivery format, the communication and relationship between teacher and student is an essential element to ensure successful distance education. Technology and media have played a crucial role in the establishment of teacher and student communication. With the delivery of instruction from a distance, careful consideration must be given to the environment in which this educational communication occurs. The communication is not always one way, but often goes from instructor to student, student to instructor and student to student. Providing a solid communication technology tool such as email, listserves, interactive television or online Internet-based courses allows for the connection of the student with the teacher, and with other students.

This paper will present the development of distance education and the technology used to deliver education. Research related to these topics will be discussed. The transformation of ideas and delivery methods have changed dramatically over the years to a form of distance education today that offers a wide variety of learning options to students from all over the world.
METHODOLOGY

Researching distance education and its role in society over the years proved to be a task that led down several paths. Working in the field of distance education gave a background of knowledge and resources. Past publications from the Iowa Communications Network, United States Distance Learning Association, and Iowa Association of Communication Technology as well as other professional publications provided some general information on advances and challenges in the field of distance education. In addition, attendance at several distance learning conferences across the country allowed for the gathering of information from speakers who addressed the issues surrounding distance education today.

The Internet's vast source of information also allowed the researcher to delve into articles, books and distance learning sites which provided a wide range of information. This tool allowed access to a greater diversity in resources concerning distance education and the opportunity to discover what is being done not only regionally, or even nationally, but around the globe.

When performing a search on the Internet, the search engines Google, MSN and Excite provided the most comprehensive results relating to distance education. Although each search tool produced a different pool of web links, those links which they had in common proved to be most useful.

In order to find research on different areas of distance education, broad descriptors were used in the search engines and then narrowed to more specific terms. Entering the words “distance education” or “distance learning” delivered a wide variety of sites, primarily those of schools that offer distance education as an option for their students. By adding the word “history” the hits narrowed and focused more on research. In addition, terms such as
"educational telecommunications," “Iowa Communications Network,” “online education,” “global education” and “educational technology” were used to gather relative information. Most of the research came from sites associated directly to the distance education history and online education web sites.

Finally, direct contact with the Iowa Community College Online Consortium for the past four years allowed for an information gathering process that included direct relations with instructors, student services personnel, administrators and students. This activity in itself gave a realistic view of where distance education is today and the needs of both students and teachers in higher education.

In the selection of material used, consideration was given to the authors and their levels of experience in the distance education arena as well as publications that have a history of providing information and research for educators. The author’s connection with distance and online education has helped to establish a clear understanding of the materials researched and knowledge of all areas concerned.
DISCUSSION AND ANALYSIS

History

Distance education is not new to our instructional world. It can be linked as far back as 360 B.C. with the use of a new technology, the written word. However, one of the most evident examples of distance education appeared in the March 20, 1728, issue of the Boston Gazette which contained an advertisement entitled, "Teacher of the New Method of Short Hand" that stated, "Persons in the country desirous to learn this art may, by having the several lessons sent weekly to them, be as perfectly instructed as those that live in Boston" (Hirst, n.d.). This was only the beginning for distance education. Throughout the decades, distance learning has evolved. By 1989, virtually every state in the nation was involved in the delivery of education to distance learners. The Carnegie Commission on Higher Education then predicted that, by the year 2000, more than 80 percent of off-campus and 10 to 20 percent of on-campus instruction would take place through telecommunications (Carnegie Commission, 1979).

Correspondence-based study, our first form of distance education, has been around for centuries. It has been independent-study oriented and was originally designed to provide educational opportunities for those who could not afford full-time residence at an educational institution. The correspondence courses relied primarily on print, the predominant delivery form of the time, which was used to mediate the communication between the instructor and the learner. Many distance education institutions in developing countries still use print-based correspondence study as the main distance education medium. Garrison (1990) referred to print-based correspondence study as the first generation of distance education technology.
In 1873, Anna Ticknor created a system to provide at-home educational opportunities for women of all classes in the society. Based in Boston, this largely volunteer effort provided correspondence instruction to 10,000 members over a 24-year period, despite its determinedly low profile. Print materials sent through the mail were the main form of communication, teaching, and learning (Wright & Watkins, 1991).

Also in the late 1800s, the University of Chicago established the first true correspondence program in the United States in which the teacher and learner were at different locations. Later the University of Chicago faculty survey in 1933 suggested that correspondence study should be justified on an experimental basis only, generating innovations and research data leading to improvements in teaching methodology. Additionally, from 1883 to 1891, Chautauqua College of Liberal Arts was authorized by the state of New York to grant academic degrees to students who successfully completed work at summer institutes and by correspondence during the academic year (Wright & Watkins, 1991).

Correspondence distance education was at that time often looked down upon as inferior education with the most effective form of instruction being that of bringing students together in one place at one time to learn from one master. This preference for the traditional educational model still remains in some schools today. Early efforts of educators like William Rainey Harper, professor of Hebrew at Yale University, who was part of the effort to grant degrees to students who completed correspondence study at Chautauqua College of Liberal Arts, were laughed at by many (MacKenzie & Christensen, 1971). Any interest regarding the effectiveness of correspondence study verses traditional study was the subject of debates and discussions. Indeed, many correspondence courses were seen as poor excuses for the real education. However, the need to provide equal access to educational
opportunities has always been part of America’s democratic ideals, so correspondence study took a new turn.

Correspondence study has grown in popularity, acceptance, and effectiveness over the years. The National University Extension Association, which was created in 1915 to research the effectiveness of correspondence education vs. traditional education, helped to turn the focus to national level guidelines, such as university policies regarding acceptance of academic credit from correspondence courses, credit transferal, and standard quality for correspondence educators have all become issues in which educators focus their attention. In 1933, the University of Chicago faculty survey indicated that correspondence study should be justified on an experimental basis which would generate innovations and data leading to improvements in teaching methodology (Gerrity, 1976). However, the problem with correspondence education is the infrequent and inefficient form of communication between the instructor and the student, and it was difficult to arrange for student-student interaction in correspondence based distance education.

The United States mail system was a dominate delivery system for over 40 years in the area of distance education, but new delivery technologies provided additional options for correspondence study. Throughout the 20th Century, many forms of technology were introduced into distance education in hopes of enriching the learning experience and to help meet the needs of society and students. Although these new “technologies” changed the interaction in distance education significantly, print remains an essential support medium. Printed syllabi are an important component of electronic distance education. Institutions that use television as their delivery medium, claim that the course syllabus (which provides printed lesson materials and guidelines for studying) is the most important form of support
for distance learners. The course syllabus can facilitate the study of texts, television programs, and other components in a distance education course (Cuban, 1986).

Educational Telecommunications

With the development of radio during World War I and that of television in the 1950s, distance education found new delivery forms. Beginning in 1920, the Radio Division of the US Department of Commerce granted educational radio stations which caused a rapid growth in the use of classroom broadcasting which enhanced instruction. In 1924 a Chicago radio station, WLS, began airing a weekly program called, "Little Red Schoolhouse." This program allowed children and teachers to discuss automobiles, farming, science programs, and other topics. In 1942, Cleveland and Chicago were found to have developed the most elaborate stations throughout the country (Cuban, 1986).

The Federal Communications Commission historically licensed numerous educational radio stations to colleges and universities. The University of Wisconsin was one of the first universities in the nation to have a radio station and by the early 1940s; the Wisconsin School of the Air was a fixture in the Midwest. The concept of education by radio was a major reason for development of instructional television (Gross, Gross, & Pirkl, 1998).

Telesvised college courses can be traced back to the earliest days of television itself and brought about great enthusiasm to educational visionaries. In 1932, seven years before television was introduced at the New York World's Fair, the State University of Iowa began experimenting with transmitting instructional courses. In 1933, the world's first educational television programs were broadcast from the campus of the State University of Iowa. Subjects ranged from oral hygiene to identifying star constellations. By 1939 they had broadcast more than 400 programs. The introduction of television was stalled by World War
II, but military training efforts demonstrated the potential for using audio-visual media in teaching (Wright & Watkins, 1991).

Since the 1950s, a variety experiments in instructional television were conducted ensuing positive results in the overall learning. In 1953 the Federal Communications Commission decided to allocate 242 television channels for educational purposes which may have contributed to the increase in television activity. In 1957 CBS began broadcasting Sunrise Semester, which ran for nearly 25 years. Mind Extension University was founded in 1987 and provided college credit courses which were broadcast over cable television (Carnevale & Young, 2001).

Although broadcast television and radio did not provide for real time two-way interaction between presenters and participants, it did, however, reach a vast number of students at a distance at the same time. By 1961, the Ford Foundation’s Fund for Advancement of Education had invested over $20 million in 250 school systems and 50 colleges across the country. In 1962, the U.S. Office of Education was instructed by Congress to invest $32 million into the development of classroom television (Cuban, 1986).

The innovative Midwest Program on Airborne Television Instruction (MPATI) introduced the "flying classroom." This program used airplanes to beam signals to classrooms in Indiana and five surrounding states (Smith, 1972). The Midwest Program on Airborne Television Instruction would transmit, at its greatest level, educational programs to nearly 2,000 public schools and universities reaching almost 400,000 students in 6,500 classrooms in six-state region. This experiment was the result of a vision of educators and the result of a $7 million grant from the Ford Foundation (Carnegie Commission, 1979).
Although the “flying classroom” teaching experiment came to an end in 1968, the MPATI project succeeded in stimulating interest in educational television in Indiana and the surrounding states and new educational television stations were started. Many see the greatest accomplishment of the MPATI project as being the ability to bring educators from the six-state region to work together to create curriculum and to design and produce an agreed-upon body of inter-institutional curriculum materials. And finally, the project succeeded in organizing hundreds of independent school districts to collaborate and generate ideas for a common educational goal (Smith, 1972). By 1972, instructional television seemed to be finding its way into the daily classroom with 233 educational stations in the United States (Carnegie Commission, 1979).

Public television soon became a widely-used medium for colleges and universities to deliver telecourses to students at a distance. Prerecorded telecourses were developed by teams of professionals and were very costly to produce. Therefore, colleges often agreed to license prerecorded telecourses from producers such as the R. Jan LeCroy Center for Educational Telecommunications to avoid the production costs (Carnevale & Young, 2001). Some PBS affiliates aired the telecourses at no cost as part of their public services mission. In the 1980’s, the FCC required local cable channels to set aside channels for public, education and government use. In 1981, the PBS Adult Learning Service was developed, which has distributed courses to over 4 million students (Gross, Gross, & Pirkl, 1998).

Although broadcast telecourses provided education to students at a distance, they were limited in distribution to the broadcast schedules predetermined by the broadcasting station, which may not always be convenient for students taking the course. These courses often ran late at night, could not be reviewed or interrupted, and were presented at the same pace for
all students. Time was not given to reflect on an idea during a fast-paced program, without losing track of the program itself. A student could not go over the same material several times until it was understood. Support materials such as pre-broadcast notes and follow-up exercises and activities were important to include keeping students in touch with the class (Hewitt, 1982).

There became a feeling that instructional television programs were little more than the delivering of a lecture via television, or a talking head. In addition, factors such as teacher resistance, the costs associated with television systems, and the inability of television alone to meet the various conditions for student learning hindered the continued growth of instructional television. (Cuban, 1986).

In 1963, Instructional Television Fixed Service (ITFS) was created by the FCC which mandated that the microwave spectrum channels be used for educational purposes. The first university to apply for licensing was the California State University (CSU) System. Several colleges and universities began using their own closed circuit television (CCTV) systems and began to take advantage of Interactive Instructional Television (ITV) systems which usually used a combination of Instructional Television Fixed Service (ITFS) and point-to-point microwave. ITFS technology provided a convenient and cost-effective way to deliver live instruction with two-way audio and video, or two-way audio and one-way video. Microwave technology is a point-to-point system connecting two locations electronically with point-to-point signals, while ITFS is a point-to-multipoint system distributing a signal to several receiving stations around a 20 mile radius. The combination of the two allowed a large geographical area to be covered (Jeffries).
In an ITFS and microwave television system, the course being delivered originated from a "studio classroom" on the campus. The availability of audio feedback permitted interaction between the teacher and students at distant locations. Students viewing the class at a remote location could ask questions through a talkback system heard by both on-campus and off-campus class members. The talk back system could either use the telephone, or FM microwave technology called radio talkback (Gross, Gross, & Pirkl, 1998).

Educational institutions implementing this form of technology were able to reach campuses and other universities, while remaining a closed circuit concept system which reached only the sites connected to the system, not the general public. For the first time, the distance students were considered part of the classroom, and the television offered education to those unable to come to campus and promoted better interactivity between teacher and students (Jeffries).

Fiber optics is a transmission technology using a glass fiber no thicker than a human hair, which conducts light from a laser source. There are many advantages to fiber optic use: it can carry a tremendous amount of data at high transmission speeds; it does not experience signal degradation over distance, and it can transmit video, audio, data and graphics to schools through a single cable. This single fiber optic cable can carry over a billion bits per second, enabling several video teleconferences to run simultaneously. Many companies, universities and states have built fiber-optic networks to carry voice, data and video (Zahn, Slimp, & Jones).

Compressed video is full-motion video information that is compressed in order to send it down at a smaller bandwidth. The compressed video method is less expensive and more flexible than the TV broadcast method. Data to enable a video signal is greatly reduced, thus
requiring a lower and less expensive data rate. As the transmission rate is reduced, less data can be sent to describe picture changes. Lower data rates provide less resolution and less ability to handle motion. Quick movement will appear to "streak" or "jerk" on the receivers screen (Zahn, Slimp, & Jones).

Most compressed video systems use either T-1 or half a T-1 channel. In a T-1 channel, video is compressed at 1.536 Mbps which is the digital equivalent of 24 voice-grade lines. Many users of T-1 codecs opt for transmission at 768 kbps which is half a T-1 channel. The difference in video quality between transmission at 768 kbps and 1.536 Mbps is slight, but the savings in cost is significant. Fiber optic networks have allowed for video teleconferencing networks to take advantage of high quality 45 Mbps transmission (Zahn, Slimp, & Jones).

Audio teleconferencing or audio-conferencing is voice-only communication. Even though it lacks a visual, audio-conferencing has some major benefits. The devices used for audio conferencing range from individual telephones and speakerphones to specially designed room systems that include speakers, microphones, and equipment to mix the sound. Audio conferences can be used for a variety of applications including meetings, the delivery of courses and training, and for guest lectures in any kind of classroom. These types of conferences can usually be set up with short notice, and are relatively inexpensive to use when compared with other technologies. A conference call between three or more persons at different locations is the simplest type of audio teleconferencing. For multipoint teleconferencing among three or more sites, an audio bridge is required to enable sites to interact clearly (Yoakam).
Another form of distance education technology is a system known as Audio-graphics which uses ordinary telephone lines for two-way voice communication and the transmission of graphics or written material. Audio-graphics add a visual element to ordinary audio-conferencing and often includes written, print, graphics, and still or full motion video information. Recent developments in computer, digital and video compression technology provide for more sophisticated forms of transferring visual materials. The computer systems have specially designed communications software that control a scanner; graphics tablet, pen, and keyboard; and, a video camera, printer, and modem (Yoakam).

Some audio-graphics systems implement a key pad device that is used for polling participant's opinions and feedback. The instructor may ask a multiple-choice question and have students use the keypad to type in their response. A central computer tabulates these responses and the instructor gets an instantaneous statistical summary of the entire group's responses, as to how well each site responded. This is a good way of soliciting and getting feedback from the participants, so that the instructor can adjust his or her presentation depending on the responses received (Yoakam).

Taking audio-graphic systems to the next level, video-teleconferencing systems are able to show an image of the speaker, three dimensional objects, motion, and pre-produced video footage. The visual properties of video-teleconferencing, which are its strengths, can be used to convey very convincing messages and can create a "social presence" that closely emulates face-to-face instruction. Video-teleconferencing has become very popular in the one-time special sessions that connect numerous sites with audio, video and data delivered right to a desktop computer providing two-way synchronous communications. This technology allows users to see each other, speak to each other, transfer application files and work together on
files at a distance. Students can use this technology for distance education where an instructor could present material to the entire class either synchronously or asynchronously. Students work together in real-time if they wish to share information. Laptop videoconferencing using cellular telephone technology makes it possible for people to hold meetings and work group sessions from almost anywhere (Zahn, Slimp, & Jones).

Video materials such as copies of open-broadcast, satellite, or cablecast programming have been used for several years to provide distance learners a supplement to various types of distance learning which desire a visual component. Specially designed video programs grant students the ability to stop after sequences to take notes on, or discuss, what they had seen and heard (Gross, Gross, & Pirkl, 1998). An important advantage to using videocassettes is that students "control" the programming by using the stop, rewind, replay, and fast forward features to work at their own pace. They provide flexibility, allowing students to use the cassettes at a time suitable to them. Students can also repeat the material until they felt they have mastered it. The "control" features of this medium allow for the use of segmented learning materials, clear stopping points, use of activities, indexing, close integration with other media, and concentration on audio-visual aspects. Video tapes have been a strong supplement to the written course work and when the instructor is part of the video, students are allowed to get to know the instructor on another level that is often not part of the distance learning environment (Lever-Duffy, Lemke, Johnson, 1996).

Although the United States has grown rapidly in the use technologies for distance education, much of the pioneering work was done abroad. The British Open University in the United Kingdom in 1969 marked the beginning of the use of technology to enhance print based instruction. Educational materials were delivered on a large scale to students in
undergraduate, postgraduate and associate degree programs. The course materials were primarily print based, but they were supported by a variety of communication technologies. The Open University model has been adopted by many countries in both the developed and developing world (Keegan, 1986). Researchers in the United Kingdom continue to be leaders in identifying problems and proposing solutions for practitioners in the field of distance education (Harry, Keegan, & Magnus, 1993).

Computers and the Internet

Computers are rapidly evolving into new areas of distance education. In the past, PCs were used in education to run tutorials and teach students to use word processing, database management, and spreadsheets. However, computers of today are considered the electronic hub controlling incoming information utilizing cable and fiber optic lines. They handle electronic mail over the Internet, and search globally for text, audio, graphic and video files needed by the user. Students of all ages have discovered the ease of communicating with their peers around the world through their computers. As more people migrate to laptop computers, the additional portability will make it possible to carry important data, and provide a valuable communication tool. Advanced software has made communication, writing, publishing and learning easier (Lever-Duffy, Lemke, Johnson, 1996).

The past few years have produced an explosion of electronic information resources available to students, teachers, library patrons, and anyone with a computer. Millions of pages of information can be accessed directly online through the Internet. The Internet is a collection of independent academic, scientific, government and commercial networks. These networks provide a conduit for electronic mail and access to file servers with free software and millions of pages of text and multi-media data that learners of all ages can use. Learners
can search databases across the globe that are connected to the Internet. Browsing tools help learners explore a huge and rapidly expanding universe of information and give them the powerful new capabilities for interacting with information. Education delivered via the Internet offers the flexibility of assembling groups at times and places convenient to participants. However, one disadvantage to online instruction has been that it lacks the benefit of the non-verbal cues that facilitates interaction in a face-to-face meeting (Lever-Duffy, Lemke, Johnson, 1996).

Recent advances in both hardware and software have allowed instructors to incorporate both streamed audio and video into their classes adding a variety of mediums to address the diverse learning styles (W.K. Kellogg Foundation, 2000).

Federal assistance programs have helped schools acquire the hardware necessary to access high speed Internet and provide a strong learning tool to all students across the country. These plans have included all levels of education and the creation of a federal task force to provide standards in telecommunications for education (West, 1993). The plan, The National Information Infrastructure: Agenda for Action from the U.S. Department of Commerce expanded access to information and the educational benefits provided from its effects will last far into the future (O'Neil, 2001).

The delivery of video for introduction can now be accomplished with video servers which are large hard drives fast enough to playback a digitized video signal. With the availability of greater bandwidth and the Internet, it is possible for students and researchers anywhere to have access to thousands of global video servers from their desktops. Such servers provide access to filmed or videotaped footage for military trainers, flight simulators, or other industrial types of training needs. It is also possible to place more of the historical visual
archives of the twentieth century in an accessible format on demand. Consumers and learners need only one channel into their home televisions and they will have access to thousands of video databases to order up a telecourse, documentary footage, movies, shows, and news over fiber optic cable (Boettcher & Conrad, 1999).

Virtual reality offers the promise of training future students in ways that currently are far too dangerous or expensive. Virtual reality combines the power of computer-generated graphics with the computer's ability to monitor massive data inflows in real time to create an enclosed man/machine interactive feedback loop. Participants wear visors projecting the computer images and react to what they see while sensors in the visor and body suit send information on position and the head and eye movement of the wearer. The computer changes the scene to follow the wearer and give the impression of actually moving within an artificial environment (Boettcher & Conrad, 1999).

Medical students wearing a virtual reality visor and data suit could perform any operation on a computer-generated patient and actually see the results of what they are doing. Pilots could practice maneuvers, as they do now in trainers but with far more realism. Beyond practical training needs, virtual reality could put students on a street in ancient Rome, floating inside of a molecule, or flying the length of our galaxy. Many scientists are now beginning to understand the power of visualization in understanding the raw data they receive. Virtual reality can be used by students and professionals to interpret and understand the universe. Individuals interacting in a virtual world will create unanticipated communities and possibly even new and unique cultures. However, the cultural consequences of technology-mediated physical social environments are mixed. While providing a wider range
of human experience and knowledge bases, these environments can also be used to manipulate and to create misleading depictions of the world (Boettcher & Conrad, 1999).

The early forms of correspondence education have transformed into an international movement using a variety of technologies to deliver diverse, quality education. The rapid growth of technology allowed for the development of courses using an array of media to be delivered to students in a variety of locations and at different times. These developments in technology have also allowed distance education programs to provide specialized courses to students in remote geographic areas while increasing interactivity between student and teacher (Jeffries).

Advanced audio and computer teleconferencing technologies influenced distance education in public schools, higher education, the military, business and industry. These technologies provided more effective distance education. In 1982, the International Council for Correspondence Education changed its name to the International Council for Distance Education to reflect the developments in the field. (Cuban, 1986)

Today there are distance education courses offered by numerous public and private organizations and institutions to school districts, universities, the military and corporations. Rural colleges use distance education to reach students who could not otherwise attend on-campus classes due to logistical reasons. In 1997-98 almost 44 percent of all higher education institutions offered distance-based courses which was an increase of one-third from 1994-95. Most of this growth was in courses that used asynchronous computer-based technology rather than two-way or one-way video (Council for Higher Education Accreditation, 2000). In the corporate sector, more than $40 billion a year was spent by Fortune 500 companies in distance education programs. It has been predicted that the amount
of information produced in today's electronic world, will increase exponentially every year. Since the 1950s, the population has doubled to over 5 billion people in the developing world. Most of these people want to be liberated and want better educational opportunities for themselves and their children (Ninthbridge, n.d.).

The desire and need for current technology and distance education does not just exist in developed countries. Increased literacy and greater educational opportunities are important, common goals that can be obtained with distance education programs. Pakistan, India and China have turned to modern methods of teaching and new forms of technology to provide low-cost instruction for basic literacy and job training (Ninthbridge, n.d.). Turkey began offering large scale distance learning opportunities and in only 12 years their distance education program enrolled almost one million students (Demiray & McIsaac, 1993).

Teacher and Learner

Although there had been significant developments in technology and astounding growth in distance education, it still struggled for recognition by the traditional academic community during the 1990s (Garrison, 1990). The development of distance education programs has been consistently challenged by the choice of an efficient and effective medium for delivery. As technologies became more complex, the selection process needed to focus on the most effective instructional delivery system. Interactive television provided an environment for teamwork between learners at different locations and enabled materials to be shared between and displayed to and from other locations. Online education provided flexibility and a variety of learning tools in one location (Boettcher & Conrad, 1999).

Throughout the years there have been a number of important studies which have been examining the interactions of various technologies with learning, course design, and
instruction. Because of the need for technology in distance education, it was appropriate to examine technology and its effects on the overall learning experience, but not to forget the teaching strategies for effective education. Regardless of the technology, the goal of every distance learning program is to provide high-quality curriculum designed to specifically meet the needs of the learners from a remote instructor. Instructional design, instructor training and student preparedness are among many factors that will affect the overall learning outcome regardless of the technology (Lever-Duffy, Lemke, Johnson, 1996).

Distance education has often been compared to the traditional face-to-face instruction on its overall quality. Although extensive research concerning which technology provides the best delivery format, several educational technologists decided that it was better to focus on what the learner gained from appropriate instructional design and practice, rather than from the technology comparison studies that often yielded no significant differences. Studies which compared different instructional designs using the same technology proved to provide more useful results for practice (Boettcher & Conrad, 1999).

Some recent studies have focused on the validity of distance education and the comparison to face-to-face instruction. Carol Twigg (2001) addressed the "no significant difference" phenomenon and looked at the comparable learning outcomes between distance education and face-to-face instruction in the Pew Symposium in Learning and Technology Study "Innovations in Online Learning." She addressed the issue as to whether distance education is as good as, better, or worse than traditional face-to-face instruction. Twigg stated in her report that Thomas L. Russell's compendium of more that 355 comparative research studies suggest that students in distance education courses aided by technology learn as well as those in face-to-face classrooms (Twigg, 2001). In general, distance learners are
more highly motivated and self-directed than the student in a face-to-face classroom. Distance learning environments require the user to be more proactive in initiating learning activities for their individual use (Ninthbridge, n.d.).

The results in the research studies of this nature were typically used by distance educators to defend the questions of quality in distance courses against those who felt that learning can only take place in the face-to-face setting. In addition, when asked, the participants in the Pew Symposium all agreed that online learning is certainly as good as classroom learning due to their years of direct experience with online learning. It has been argued that if learning outcomes are measured using the same set of assessment tools in face-to-face instruction as are in distance education courses, and if the course design contains the same academic rigor for both delivery platforms, then the learning outcomes should be equivalent. This should be true because courses delivered face-to-face and through a distance deliver format should be designed to meet the established learning objectives that are tied closely to the assessment (Clark, 1994).

Twigg (2001) suggested that we should go beyond the “no significant difference” idea and show how distance education can offer learning tools with the aid of technology that are not available in the face-to-face environment and thus raise the quality of distance education even farther. She suggested that when used properly and effectively, distance education can provide an overall better educational experience. Therefore, the participants of the Pew Symposium questioned what could be done with the technology available in the online classes that could not be done without it and focused on how the online learning could improve the quality of student learning (Twigg, 2001).
The ability to customize the learning environment for each student in order to increase their achievement can be accomplished in an online environment due to technology. This allows students to learn in a way that best benefits them (Twigg, 2001). Every student enters the educational situation with some pre-conceived notions and expectations. If these expectations are not met, the learner becomes dissatisfied and loses motivation. Most distance students expect courses to follow similar cultural assumptions as face-to-face courses. Therefore, the total learning experience needs to be considered in designing a course (Ninthbridge, n.d.).

Shearer (2002) agreed that a deeper look should be taken into how educational technologies and distance education enrich the educational experience and surpass what can be done in the face-to-face setting. In addition, he challenged with the question of what we consider valuable in a face-to-face class and how can that be brought into a distance learning environment. The overall experience students have in the traditional setting is often very different than that in a distance learning environment. Therefore it is not only important to look at equivalent learning outcomes, but to also understand the overall mission of delivering a course or courses at a distance and determine how to incorporate those valued face-to-face qualities (Shearer, 2002).

In a face-to-face class, students have human interactions and a social presence. Human contact is often necessary for more than providing learning content, but for encouragement, praise and assurance. Feedback is essential in helping students to keep working even times are tough (Twigg, 2001). Based on Shearer's work, the research question should be "how and through what technology can we provide these aspects of education to distance students? Video teleconferencing or a combination of distance education and face-to-face meetings has
been used in attempt to provide these components. More recently, online courses provide chat rooms and threaded discussions to create a better sense of community.

Students in distance learning courses learn from each other more than they do in a face-to-face class. Students take on the role of "teacher" more often than those in traditional classrooms, which can help create a better sense of community in the course and provide students the needed feedback that the instructor can not always provide. This sense of belonging and community increases student success and learning (Shearer 2002).

Other studies focused on the learning style variables and the methods used in distance education to address these variables. Boverie, Nagel, McGee and Garcia (1997) used the Kolb Learning Style Inventory (1998) in their study of learning styles, emotional intelligence, social presence and their satisfaction with the distance learning. They concluded that only social preferences existed as a significant predictor of course satisfaction. James and Gardner (1995) suggest that learning styles are cast with a perceptual, cognitive, and affective framework, and suggest that the design of a distance education course should conform to the needs of the students (Twigg, 2001). Overall, this research showed that while learning styles do not necessarily impact how students interact with the overall instruction or their relationship with their instructor and other students, learning styles do affect the students' satisfaction with the learning activities. Since distance education has been primarily learner-centered instruction, and learning styles of each student may vary, it is important to examine how the student, the instructor and the technology work together. This may require the design of the course to address a variety of learning needs (Boettcher & Conrad, 1999).
The research has verified that the learning styles of students should be considered in course development and activities should respond to a greater variety of learning styles instead of designing for only one type of student and advising all others to avoid the online environment (Twigg, 2001). "In distance education, instruction requires extensive choreography" (Lever-Duffy, Lemke, Johnson, 1996). If a learner becomes frustrated or feels isolated in the environment, they will often give up. Therefore, the instruction must be well planned and careful consideration should be given to the variety of learning styles. Students must be able to navigate their learning environment and be allowed to build relationships with other students.

In response to critics and skeptics and to explain the explosion in distance education interest, several researches explored the underlying assumptions of what make distance education so different from traditional education. These pioneers in distance education took a close look at what it meant to be a distance learner, that person who is physically separated from the teacher (Rumble, 1986). These students received a planned and guided learning experience (Holmberg, 1986) and participated in a two-way structured form of distance education which is different from traditional classroom instruction (Keegan, 1988).

The distinctions between traditional and distance education programs becomes blurred when the distance is not defined by geography but by the interaction within the course. As the interaction increases in all areas, the feeling of distance decreases. Therefore, it is not location which determines the effect of instruction, but the amount of interaction. This concept may refer to traditional classrooms as well as distance ones (Keegan, 1986).

In past distance education environments, interaction between the student and the instructor usually took the form of correspondence or self-assessment exercises that the
student completed and sent to the instructor for feedback. Interactive strategies are a large part of today's design process. How you can facilitate interaction is relative to the technology used to deliver instruction. It may happen in "real-time" or asynchronously. It can be influenced by a number of factors such as the number of students at a given site, and the number of sites may have a significant impact on interaction. The style of the presentation may also affect the interaction from various students. Including thought provoking questions and time for group review may allow for better interaction among students. Finally, classes limited by time constraints may influence interaction. Those courses that are asynchronous and require students to be in a specific location at a given time may not allow for as much interaction as an online course which allows a student time to reflect before responding (Boettcher & Conrad, 1999).

Humanizing a distance learning course has been proven to enhance interaction and student success. By allowing the students to get to know the instructor and other students, bonds are created and communication improves. When the instructor better understands who their students are, the easier it is to design an effective curriculum to ensure student success.

Wedemeyer (1977) and Moore (1973) approached distance education in a slightly different manner where three primary factors are involved. They stressed learner independence as a crucial component but also believed that interaction and communication were key to effective distance education. Wedemeyer (1981) went on to identify the elements of independent learning as: the level of student responsibility; widely accessible instruction; effective use of multi-media and teaching methods; the adaptation to individual learner differences; and a wide variety of start, stop and learn times.
Moore (1990) also felt that success in distance education was based on the dialog between teacher and student and the effectiveness of the communication system in an educational process. He discussed three types of interaction essential to distance education: learning-instructor, learner-content, and learner-learner. Learner-instructor interaction is the component that provides motivation, feedback, and dialog between the teacher and student. Learner-content interaction is the method by which students obtain intellectual information from the course materials. Learner-learner interaction is the exchange of information, ideas and dialog that occur between students about the course whether this happens in a structured or non-structured manner. The concept of interaction is fundamental to the effectiveness of distance education programs as well as traditional ones.

A fourth component, learner-interface interaction, deals with the interaction between the learner and the technology which delivers instruction as a critical component. This includes understanding how the use of the technology and learner and instructor interact. Learners who are unfamiliar the technology may need extra time learning to use the technology. This prohibits student learning in that it takes away from the time they have to learn course material. It is essential that courses include time and interfaces that allow the learner to successfully learn and adapt to the technology (Boettcher & Conrad, 1999).

Overall, the research strongly suggests that strong student-instructor interaction is important in order to decrease anxiety and increase motivation. Distance education often serves adult students who possess unique needs, motivations, goals and self-concepts (Ninthbridge, n.d.). During the 1980s, when distance learning experienced is most significant growth, 67 percent of the participants in distance education were female. Participation of women in distance learning was directly related to political and social
changes across the country. A woman's position within the family and society, technological changes in the work place, and the economic necessity of participation, and the job market and new job opportunities were changing and the need for additional education became evident. In addition, often distance education students are single parents and want to stay close to home or can not afford daycare. Many are married, part-time students, employed full time, and paying for their own schooling. A large percentage of the students are between the ages of twenty-five and forty-five years of age. Students with physical disabilities are also able to attend class when it was not possible in the traditional method (Gross, Gross, Pirkl, 1998). Administration, instructors, and curriculum designers must consider the needs of the adult student population when designing distance education program (Boettcher & Conrad, 1999).

Adult students generally enter the learning environment, whether traditional or distance, with a higher degree of motivation. In a study conducted by Roger Rezabek in 1997 which focused on the motives, barriers, and enablers for adult distance education students enrolled in Iowa's community colleges. Rezbeck (1999) found that distance students were primarily female on the average of 28 years old, had a high school degree and were working at least part-time. These learners were motivated by their desire to move from their current level of proficiency to a new, higher level. Some desired advancement in their current jobs; others were enrolled for personal gain. Although these adults possessed a high degree of motivation, there were several barriers encountered. Factors such as lack of money and time, study skills, and the technology associated with distance education, led to of anxiety (Rezabeck, 1999). The importance of student anxiety should not be underestimated in the distance educational setting. The anxieties that learners experience in the traditional
classroom setting tend to be aggravated when that learning is mediated by technology (Garrison, 1989). Distance education students often have greater freedom, however, with that freedom comes additional responsibilities. This freedom requires students to make a number of important decisions which would normally be made for them in a traditional classroom setting. This freedom and extra responsibilities are often welcomed and achieved by many students, but there are many who find this to cause additional stress and anxiety to the learning experience.

As stated earlier, student independence and learner control have been proven to be key elements in the distance learning environment. Studies conclude that students who perceive that their academic success as a result of their own personal accomplishments have an internal feeling of control and are more likely to continue their education. Students who have an external feeling of control feel that their success, or lack of it, is out of their hands and are largely due to events such as luck or fate. Therefore, externals are more likely to become drop-outs.

"Student Control" is one that influences the drop-out rate. It has been a focus of concern to distance educators as they try to predict successful student achievement. Control of one's learning environment is more than just independent learning. A model to examine the concept of control was developed by Baynton (1992) and is defined by primarily by independence, competence and support. Baynton confirms that these three factors, as well as others which may affect the concept of control, more accurately portray the complex interaction that must occur between teacher and learner in the distance learning setting.

Online education provides an ideal learning environment and a strong communication tool for bridging time and space among those who share similar interests and educational goals.
The creation of "online communities" leads to a 'learning society' where students feel as if they belong to the group and are sharing experiences as well as learning from everyone else (Boettcher & Conrad, 1999). Due to the openness of the online course environment, all students have an equal opportunity to contribute. However, class members may have difficulty reading the computer screens and following a variety of online, visual cues.

Distance educators should review the amount of material students are required to read both on and off the computer screen. Overall, evidence shows that in online education, the benefits seem to outweigh the disadvantages (Boettcher & Conrad, 1999).

The social environment and how it affects motivation, attitudes, teaching and learning in which distance learning takes place has also been as a significant area for research. In the early 1980's, an increasing number of students in developing countries gained access to higher education through distance education programs. However, language and culture differences of countries and people proved to hinder course and program development. The cultural values of the instructor were dominant indicating that appropriate design of instructional material is critical to the effectiveness of the course. "Who designs what and for whom" is an important element to the economic, political, and cultural dangers that face distance educators using information technologies (McIsaac, 1993).

Today, with the expansion of the Internet and other global technologies, there is a widespread idea that technology is culturally neutral and can be easily used in a variety of settings. However media, materials and services are often transferred without attention being paid to the social setting or local culture of the student (Boettcher & Conrad, 1999).

Technology-based learning activities are also used without consideration to the impact on the local social environment. Discrimination and equality among participants of different
genders, races and physical features has been addressed, but social equality and cultural
differences do not appear to extend to all learners. In addition, participants who are not good
writers are often required to communicate primarily in a text-based format. Providing
communication that is mediated and social climates are neutral is important when
considering equality for all students.

Another social factor that is significant to distance learning is social presence, where a
person feels "socially present" in the distance learning classroom situation. Although
technologies offer participants varying degrees of "social presence," studies show that
learners in an interactive television class found that cues such as encouraging gestures, smiles
and praise were social factors that enhanced both students' satisfaction and their perceptions
of learning. In the online environment, time and class assignment allowing for students to get
to know one another helped to create a social environment and an individual social presence
for each student. Social presence, immediacy and intimacy are social factors that have
proven to be significant in the development of student success and satisfaction and should be
a primary concern for distance educators (Boettcher & Conrad, 1999).

As traditional and distance education classes incorporate more interactive, multimedia
technologies to enhance individual learning, the role of the teacher changes. They are longer
seen as just the knowledge source, but as a facilitator of the course and learning materials. In
addition, faculty and student support services are vital to the success of a distance learning
class. Poor quality in technology and lack of technical support may create a negative impact
on users.

Support from administration, support services and technical support can determine if a
program is successful. Appropriate financial commitment and college commitment to this
form of education reflects on an instructor's feeling of importance and support. If faculty do not have the operations support and logistics are not in place, they soon become frustrated. A solid plan for the distribution of class materials, test security, proctoring, textbooks, class scheduling, and site facilitation are as important to the educational experience as an form of technology (Gross, Gross, & Pirkl, 1998).

More and more institutions involved in distance education are moving toward blended multi-media systems utilizing a combination of technologies that are both synchronous and asynchronous and that meet the needs of learner. Courses delivered via television are now being supplemented by online materials creating what is typically known as a hybrid class (Boettcher & Conrad, 1999). Course management providers such as WebCT, Blackboard and eCollege provide online course shells in which an instructor can upload material they want students to access outside the physical classroom. The websites used to house these tools are often password protected and only allow enrolled students to login.

Telecommunication and online programs can now be found across the globe, connecting people from various nations together in new and exciting ways. The borders of our educational world continue to shrink as the search for new technologies and techniques to improve communication at an international level continues. The availability of various communication technologies provides cost effective solutions to the problems of sharing information and promoting global education. The recent development of computer technologies has been responsible for much of the attention that distance education currently receives (Boettcher & Conrad, 1999).

Technology comes in many packages, but regardless of the medium chosen to deliver distance education, the educational goals have remained consistent. Students are offered an
alternative to traditional education that will offer degree granting programs, battle illiteracy in developing countries, provide training opportunities for economic growth, and offer enriched curriculum in non-traditional educational settings. At the same time, interest in the unlimited possibilities of individualized distance learning is growing with the development of each new communication technology. Careful consideration and evaluation should be given to how the technology influences the achievement of the learner. Administrators of distance education should not focus exclusively the technology used to deliver instruction, but to carefully identify how that technology interacts with students and how it affects teaching and learning (Boettcher & Conrad, 1999).

CONCLUSION AND RECOMMENDATIONS

Distance Education is a field that appears to be in a constant state of evolution. The history of distance education shows nontraditional education trying to blend with traditional education while striving to meet the challenge of constantly changing learning theories and evolving technologies. As distance education grows and evolves throughout the world today, theoreticians and practitioners need to stop emphasizing points of difference between distance and traditional education, but instead to identify common educational problems. Distance education is simply education at a distance with similar questions relating to the social process of teaching and learning. The possibilities of how we deliver education at a distance are not controlled by the technology used or the distance, but from the narrow thinking that occurs when new technologies are introduced. Often the proven technologies are abandoned for the latest "and greatest" technology before proven educational experiences are delivered.
Educational institutions should focus on the interactions of technology with teaching and learning and should address issues such as achievement, motivation, attrition, and control. Technological advances can help to blur the distinction between traditional and distance educational settings if used effectively. When used properly, distance education courses and the use of the technology provided can provide learning opportunities not possible in the face-to-face setting. Better forums for assessment, communication, and sense of community and socialization can be achieved through the use of the right use of the right technology. I recommend building learning communities that provide for learner-center instruction as well as the ability to learn from other students as well as the instructor help students increase their educational success and provide a more meaningful learning environment. This can be achieved by personalizing and humanizing a distance education course by allowing students to get to know the instructor and the instructor to take time to get to know each student. This may take more time, thus time away from actual instruction, but the advantages of building this sense of community will prove rewarding.

Distance education programs will surely continue to grow both in the United States and throughout the world primarily because it offers life-long learning to working adults and will play a significant part in educating societies around the world. Distance education will grow in importance because it is cost efficient and it allows for independent learning by working adults.

Today, distance education should no longer be viewed as a marginal or inferior education. Instead, it should be regarded as a viable and cost effective way of providing individualized instruction. This reality has significantly taken place in the more recent years with developments in online education and the creation of online degree programs from reputable
educational institutions. The boundaries between traditional and distance learners are diminishing as more students have the opportunity to work with multimedia designed for individual and interactive learning.

I recommend that educational institutions focus on strengthening educational communities in distance learning environments, training "Master" distance educators who mentor and train other teachers from all levels of education and by providing students the necessary support services. This would allow distance education will become a bigger part of our "every-day" education. However, in order to accomplish these goals, educational institutions may need to set aside annual funding specifically for these activities. In addition, state and federal governments must also become committed to providing dollars to support these activities. To simply focus on the technologies used in distance education and to only provide funding for equipment and not for supporting activities, disallows distance education to grow and provide the quality education that is possible. Understanding student learning styles, developing independent learners and learning communities, and using technology in its most effective form will allow distance education to rid itself of criticism.
REFERENCES


Carnevale, D. & Young, J. (2001). Telecourses change channels. They lack the hype of online courses, but they may educate more people. [Electronic version]. *The Chronicle of Higher Education.*


Scriven, R. Lundin, & Y. Ryan (Eds.), *Distance education for the twenty-first century*, (pp. 403-406). Oslo, Norway: International Council for Distance Education.


