Distance Learning and How Access to Education Can Be Improved

Scott Collins, MS, RT(R)(T), CMD
School of Allied Health
College of Applied Sciences and Arts
Southern Illinois University at Carbondale

Richard C. McKinnies, MS Ed, RT(R)(T)
Radiologic Sciences Program
Southern Illinois University at Carbondale

Sandra K. Collins, PhD, MBA
Health Care Management Program
Southern Illinois University at Carbondale

Introduction

Throughout history, access to quality education has been an issue for many individuals. There are a variety of reasons which may have contributed to the accessibility issues including race, economic status, health conditions, and the general geographic region where a person lives. These barriers have historically prevented many people from receiving equal educational opportunities.

With advances in technology, distance education is emerging as a formidable opponent and could potentially even the playing field in terms of educational access. In order to determine the viability of this method of delivering education, a historical evolution of distance learning (DL) was explored. This extensive literature review provided an introspective analysis of the types and components of distance learning. It also revealed the strengths and weaknesses, as well as the factors associated with considering distance learning as a means to increase the accessibility to education.

Methods and Research Question

The purpose of this paper is to examine distance learning as a viable educational method in terms of making education equally accessible to all individuals. The literature review was performed using EBSCO, ERIC, and other educational search engines along with keywords associated with distance learning and access to education. The outcome of this research is to determine if distance learning is a viable option to expand access to education.

Obstacles Limiting Access to Education

Every individual deserves equal opportunities to education; however some encounter obstacles that limit their access to education. In some instances, access to education has been affected by race and at other times it was financial matters. The health status of an individual may also cause access restrictions to education while in other situations the geographic location in which one lives may cause problems. Lastly, legislation requirements may impact the course offerings at many schools.

For many years African American students were not allowed to go to school with white students and many black schools typically did not have the funding that white schools had. Brown versus the Board of Education did rule to dismantle segregation but equal access to education is still an issue. In many cases the unequal access is in the K-12 educational range but in some others it occurs at the college level. Harper states that many African Americans are not offered the advantages that come with college degree attainment compared to white students (Harper, 2006).

The ability to pay for education also causes many obstacles for students. In the higher education arena, a student is not allowed to attend college if they cannot pay for it. Of course there is financial aid but many times the student will not qualify for enough assistance to make education affordable. The student might be able to pay the tuition but cannot afford the housing fees that go along with attending a university. If the student has the opportunity to live at home with their parents, a possible solution to this problem may be receiving their college education via distance learning.

In the K-12 system, money also plays a big role in the quality of education one receives. Schools that have adequate financial resources have the ability to pay for the staffing expenses to retain quality teachers. These districts are also able to provide for

proper instructional materials which are crucial in creating a proper learning environment (Minow *et al.*, 2008).

Another area that may cause disparities in education is the health status of the child. In some cases, the child may require special isolation techniques for the safety of the child, other students, and teachers. The student is very capable of learning and doing their work but cannot be in the school environment. These children may miss a lot of school for a variety of reasons and it can take a lot of time for them to catch up and learn the material they missed. This time requirement causes many parents to have concerns that their child will be held back in school or not reach their full potential. In other health related issues, the student may need a specially trained instructor that is not available in the local school district. If a special instructor is not brought in, the parents will have to settle for an inferior education (Hewitt-Taylor, 2009).

The geographic location in which one lives may also cause limited access to a quality education. Many people live in metropolitan areas while others are in very rural communities. Individuals who live in a rural community are much more likely to receive a limited education compared to those in a metropolitan area. The state of Kentucky has reduced these limits by investing in videoconferencing abilities to connect thriving urban centers to isolated regions of the state. Australia has experienced similar education access problems so it also implemented videoconferencing technology in 1997. It worked so well in Australia that their efforts received the International Teleconferencing Association's Excellence Award ("Distance learning brings the world to students in remote areas", 1998).

No Child Left Behind (NCLB) requires "highly" qualified teachers to teach subjects in schools with the goal of increasing student achievement ("No child left behind act of 2001", 2001). In an effort to make sure every student receives a quality education, a shortage of qualified teachers has been created. In an attempt to meet this requirement, some school districts have had to form online environments to meet the demands included in NCLB. The biggest teacher shortage has been in rural schools; therefore, 46% of their districts are using DL versus 28% and 23% in urban and suburban districts respectfully. Many of these schools report using two-way video conferencing while others use asynchronous computer based instruction via the internet to overcome this obstacle (Setzer & Lewis, 2005). These DL methods are creative ways to use technology and meet the requirements of education legislation.

Given these obstacles for access to education, DL could be a possible solution. Almost in every scenario, the reason for decreased access is due to the lack of qualified teachers whether it is for lack of funds or geographic location. Live video conferencing could be used to bring in the lectures from another school. This would allow for the subject matter experts to deliver lectures on specific topics similar to the methods used in Kentucky ("Distance learning brings the world to students in remote areas", 1998). Distance learning would allow these districts to maximize resources and offer a quality education to their students.

Defining Distance Learning

Distance learning occurs for the education process when the teacher and student are separated by distance and/or time (Barkhi & Brozovsky, 2000; DeBourgh, 2003). Schlosser and Simonson say there are four main components when defining distance education.

1. Distance education is different from self study when it is institutionally based. Self study would be taking courses for leisure and have no specific time frame for completion.
2. The teacher and student must be separated in terms of geography or time which is also mentioned by Barkhi, Brozovsky and DeBourgh.
3. There needs to be interactive telecommunications available for students to interact with each other, with instructional resources, and the instructor.
4. An environment that promotes learning and learning experiences by having the proper resources (Schlosser & Simonson, 2002).

If a learning environment has these components, DL will provide an optimal learning environment to students. Obviously, a vital aspect in successful DL delivery is communication. Students must be able to communicate effectively with their instructors and peers to maximize their learning experience.

History of Distance Learning

Distance learning has been used in the United States for many years. One of the earliest uses of DL began in 1873 when "The Society to Encourage Studies at Home" produced print-base correspondence. This society was developed by Anna Eliot Ticknor with the purpose of offering ladies of all classes the opportunity to education. Students had the ability to take individually planned courses in the midst of daily responsibilities. The courses incorporated communication between the instructors and students to help ensure success. The school existed for 24 years and served over 7,000 students (Rockwell & Churchill, 1886).

Then in the early 1900's, radio technology offered more public access to DL via audio broadcasts. Synchronous delivery became available in the 1950's when the telephone was introduced. This allowed for the bridging of multiple phone lines to have a phone conference. Television expanded DL during the 1960's to the 1980's when video technology became available. Technology has continued to evolve and also includes, but not limited to cable, microwave, and satellite transmission (Olmsted, 2002). More recently, synchronous and asynchronous DL has occurred through the use of personal computers (Armstrong *et al.*, 2000). Internet capabilities are also expanding and allowing more access to educational resources and instructional experts from the convenience of an individual's work and/or home (Hayes & Huckstadt, 2000).

Types of Distance Learning

There are a variety of DL formats that can be offered. These can be as simple as printed coursework delivered via the postal service or as sophisticated as the use of live video conferencing equipment. To expand this further there are two main types of DL, asynchronous and synchronous delivery. Asynchronous delivery occurs when there is a delay between the teacher and student interaction. Correspondence coursework, recorded lectures, and a website where content information can be posted for the student to read

are examples of asynchronous delivery. Synchronous is when there is live interaction between the student and teacher or classmates in real time. Examples of synchronous delivery include conference calls and live video conferencing at home or at a distance education center. The following provides a brief overview of the asynchronous and synchronous distance education.

Asynchronous Distance Education – Correspondence Courses
         The oldest form of DL is the print based correspondence courses. This is when educational packets are sent to and from the student and educational institution via the postal service. Due to the history of this DL format, correspondence courses are usually well organized into separate manageable units of study (Collins & Having, 2005). Correspondence courses offer convenient access to the material and are easy to fit into one's lifestyle. These courses are very affordable and require no use of technology. The student must have a high level of self discipline for this format as there is very little interaction between the student and teacher (Campbell, 2003). The student must set aside an adequate amount of time to successfully complete the course requirements by predetermined timelines.

Asynchronous Distance Education – Audio Tapes/CDs & Video Tapes/DVDs
         Another version of distance learning is the use of audio and video tapes. Over time, these have been replaced with CDs or DVDs but have a similar style of delivery. These methods of learning require a minimal level of experience with technology. The CDs allow the user to learn through the single sensory function of hearing while DVDs use both visual and hearing senses. The DVDs can be generated from a simple video camera set up to record the classroom instruction or as advanced as a full scale quality digital production. A major advantage of using CD or DVD technology is that CD or DVD players are typically easily accessible making special equipment unnecessary. Another plus is the benefit of being able to access the material as many times as needed with the opportunity to review one specific section or the entire lecture (Petracchi, 2000).
         Both of these methods of distance education may be multi-tasked with other activities but the level of retention may be affected. One of the largest drawbacks in using CDs or DVDs as a method of learning is the inability to interact with the teacher or fellow students (H.E. Petracchi & Patchner, 2001; Collins & Having, 2005). It should be noted again for this style of learning, students must be diligent in performing the work on a continuous basis or procrastination will be a significant problem (Petracchi, 2000).

Asynchronous Distance Education – Television/Satellite Center
         Asynchronous delivery can occur through a cable feed to an individual's television at home or via microwave/satellite signal to a specific off site location that is equipped to receive the content. This type of DL takes place at a specific time on a specific cable channel or at a particular location due to the broadcast requirements. An advantage of this form of delivery is that the information is usually more up to date than printed correspondence courses. Another benefit is the opportunity for experts in the field to record lectures and share with students about current events related to the subject matter. The students who attend an offsite location indicate the interaction with fellow students are a positive benefit. Conversely, disadvantages of this type of asynchronous

delivery include equipment failure and the lack of flexibility in taking a course, i.e. set time and set place (Tollefson *et al.*, 2003). Even though this delivery technique lacks immediacy in regards to the nonverbal interaction that takes place in a traditional classroom along with the lack of live dialogue between the student and teacher, students have evaluated this teaching technique positively (DeBourgh, 2003).

Another type of asynchronous delivery includes the use of interactive CDs or web-based internet courses through a computer. This method allows students to have access to the tremendous amount of learning resources that are located on the web. Students can use email, chat rooms, and discussion boards to interact with classmates and/or the instructor (Hayward & Cairns, 2001; Jedlicka *et al.*, 2002). Another benefit of this type of learning is that students can take time to digest the information and then make logical responses with their postings or comments (Fullerton & Ingle, 2003; Landis, 2001).

Even with these benefits there are some disadvantages mentioned. These include the cost of the technology such as computer hardware and software along with unreliable Internet service. One must also have the computer skills necessary to install software, create and save documents, add attachments to emails, and post comments on a discussion board. If these are not present, the student's learning experience will be hindered (Atack, 2003; Campbell, 2003; Tollefson et al., 2003). Students who do not have these skills may have difficulty at the beginning of the course but often become proficient rather quickly, and in the end indicate that learning these computer skills were an added benefit of taking the course. Individuals who have taken Internet based courses state a readiness to do again in the future (Atack, 2003; Collins & Having, 2005).

Synchronous Distance Education - Live Video Conferencing

Live video conferencing allows for a synchronous DL experience. This technology offers both audio and visual interaction in the learning environment. Students can be dispersed in many different locations but have the ability to interact live with their instructor and fellow students. There are various formats of live video conferencing; some require the student to attend a pre-arranged satellite facility while others allow them to do the same thing from home.

The pre-arranged satellite facilities offer students the ability to interact directly with other students at their same satellite location. It also allows for video/audio communication with the main classroom where the instructor is located and many satellite centers can be connected with the same instructor simultaneously. A major benefit of this format is the technology is provided for the students and they have no personal technology expenses for their home, however, they have to travel to the satellite location for their class. Satellite facilities are commonly used in today's educational arena.

A more convenient method of video conferencing is now available from the student's home or office. Students need a computer, camera, microphone and high speed internet to connect to the classroom and in some instances, special software is required. This method has become available due to the enhanced availability of Internet bandwidth. It offers more flexibility than the satellite centers, however students do have an increased expense in equipment, which is a trade off for not traveling.

The live video conferencing via satellite centers or on the student's personal computer allow multiple sites to be connected with the traditional classroom at the same time. One of the main advantages of live video conferencing is the ability to have instant communication between the teacher and students (Petracchi & Patchner, 2000; Collins & Having, 2005). This technology offers a number of conveniences for the student but it can also affect their satisfaction with the learning process. The most commonly cited problems with live video conferencing are the equipment not working properly and the lack of instructor's expertise in knowing how to operate the technology. Another important concern that students have mentioned is the ability to create a community of learners with fellow students is important in the learning process (DeBourgh, 2003; Collins & Having, 2005).

Uses of Distance Learning

Distance learning has been employed in a variety of educational settings. Many times DL has benefited the K – 12 educational system and in other settings, higher education was the beneficiary. Distance learning has also been used by education institutions to reach the international market for offering quality education to individuals in other countries.

The K – 12 educational system experienced tremendous growth (a tenfold increase) in using online learning between 2002 and 2005. Due to this rapid expansion, O'Dwyer, Carey, and Kleiman (2007) performed a study in Louisiana to determine if online learning was as good as the traditional face-to-face instruction. To test this question, researchers compared the outcomes of an online class of Algebra 1 to the outcomes of a class under regular instruction. For students to be allowed to enroll in this study, this had to be their first time in attempting Algebra I. Their school district also had to demonstrate a need for certified mathematics teachers. Under these stipulations, 257 students participated in the study. The results from a pretest/posttest analysis along with questions about the online experience demonstrated that the DL is a viable option for delivering Algebra 1 instruction. Students also indicated that using technology to learn math, working with other students, and overall new experiences as positive aspects of taking an online Algebra I course. However, on the down side, approximately 20.7% of the online students compared to 6.3% of traditional students indicated they did not have a good experience in the course. Another negative outcome was that 49.8% of the online students compared to 67.6% of the traditional students indicated they feel "confident" or "very confident" about their algebra skills even though they had similar post test results. This outcome is comparable to other studies that indicate students from online environments have poorer perceptions of their learning but one needs to understand that other studies have more positive outcomes (O'Dwyer *et al.*, 2007; Beyth-Marom *et al.*, 2005; Summers *et al.*, 2005).

Kentucky, most likely has one of the most comprehensive DL systems in the country. This state has invested $16 million in state and federal funds to create an educational telecommunications network. The purpose of this investment is to improve the quality and access to educational offerings for elementary and high schools. To achieve this, VTEL video conferencing systems were installed in the K-12 schools throughout the state. By doing this, the quality diverse education offered in urban centers can be presented in isolated/rural communities as well. These video conferencing

systems have allowed students to experience a two-way interactive conference with the U.S. Department of Education Secretary along with a Congressman in Washington, D.C. In other instances, students in rural communities are taking advanced level courses that were not previously offered in their school districts. Overall, this technology allows the students in Kentucky to learn in a global society ("Distance learning brings the world to students in remote areas", 1998).

Another state that has greatly benefited from the use of DL is Texas. Dallas County Community College District is using videotape based tele-courses, instructional Television Fixed Service channels, and satellite up-linking/down-linking to provide information, instruction, and training to many places locally, nationally and internationally. This organization not only provides education at the college level, it also works with a national provider, Regional Instruction Television Consortium (RITV), to deliver instruction to K-12 students. This provider has also been used by the U.S. Armed forces on ships and at military bases around the world (Ball *et al.*, 1994).

Together the Dallas County Community College District and RITV offer a large variety of courses such as Algebra, Ethics, Accounting, and Spanish or Japanese via live/interactive classes for individuals at all education levels. A stated benefit of offering courses to many locations at the same time via DL is the congruency in the content delivered as the instructor and presentation style are the same. This format also has cost benefits as the instructor can reach many students in a variety of locations all at the same time. These programs started in 1972 delivering an American Government course to 399 students and now serve over 10,000 students annually (Ball *et al.*, 1994).

Access and Enrollment Benefits from Distance Learning

Distance learning allows students to have access to the quality education, quality teachers, and innovative delivery methods without having to travel long distances to receive it. It also allows students with a busy schedule the flexibility to gain an education when it is convenient to them. If one is using satellite education centers connected by video, and there are only 10 students at each site, it does not take long to have enough enrollment to make the delivery cost effective. As previously mentioned, with today's technology, satellite centers are not necessary due to the fact that video conferencing can be completed from a student's home. This helps provide a means of access and equity across the nation by allowing students to participate in education that otherwise would not be available and can be delivered the same quality instructors who teach in a traditional setting (Ball et al., 1994).

Factors to Consider when Choosing Distance Learning

Advances in technology are creating new avenues in which DL can be offered. Both students and educators need to be aware of these formats and understand the advantages and disadvantages of each. Some of the factors to consider are the level of understanding of technology, time required, self-discipline, need for live interaction, convenience, and cost.   These factors along with the student's learning style must be considered in order to have a positive educational experience in achieving their goals (Collins & Having, 2005).

Rice states that the use of distance education has increased learning opportunities at all levels of public education. This author performed a literature review of many

different publications related to DL and found a variety of factors that predict success in such courses. Success is defined as a student successfully completing the course with a grade of C or better. If the student received a letter grade of a D or F, or if they withdrew from the course they were not considered a success. These factors include achievement and self-esteem beliefs, responsibility and risk taking, technology skills and access, along with organization and self-regulation. The first factor is important because it relates to the self-motivation that is required to complete the requirements of an online course. Responsibility and risk taking are related to an individual's initiative and how well one takes responsibility for their actions. The third factor is important in that a student must have access to technology and have the skills necessary to operate the equipment. These can include basic computer skills. Organization and self regulation are very important as well because students must have the study skills to review materials which are organized in a presentable manner (Rice, 2006).

Along with the predictors of success in a DL course, Rice indicates that all DL students take these courses for similar reasons. These include but are not limited to convenience, schedule flexibility, credit recovery, opportunities for accelerated learning, conflict evasion, and the ability to take a course not offered at their school (Rice, 2006).

Quality of Distance Learning

One of the most important questions about distance learning is whether or not the quality of the education received is the same as that delivered through the traditional classroom. Many studies have been performed to test this and for the most part, the conclusion is that equal learning can take place in a distance environment (Beyth-Marom *et al.*, 2005; Summers *et al.*, 2005). For the purposes of this paper, two research findings will be discussed. In one setting students were enrolled in a statistics class and in another a research methods course; neither one produced significant differences in learning (Beyth-Marom *et al.*, 2005; Summers *et al.*, 2005).

In the statistics course, two sections of the class were taught by the same instructor during the same semester. The instructor had taught this course in a traditional format for many years and had a high level of success. The face-to-face section had 21students enrolled and 17 were in the online asynchronous version. Each course also had the exact same materials used, however for the online group, the instructor was only allowed to communicate with the students via email. In the end, the level of learning did not differ based on cumulative score calculation from all exams. The communication between the instructor and student was evaluated lower (Summers et al., 2005).

 For the research methods course, two different means of delivery were used. One group had 92 students enrolled in a synchronous format using satellite signal while the second group used a mixed technology delivery. This format had 73 students with a mixture of videocassette delivery for more than half of the class with the remainder delivered via satellite for a synchronous delivery. Again, no differences were found in academic achievement based on course performance and questionnaires but the second group indicated a stronger preference for taking an asynchronous course again in the future (Beyth-Marom et al., 2005).

In each of these studies, distance learning allowed students from different backgrounds to attend the same class. Some were non-traditional students that had other responsibilities while some were geographically displaced. Even with these differences,

the learning in distance courses was equal to learning in the traditional classroom when course performance was reviewed (Beyth-Marom et al., 2005; Summers et al., 2005).

Conclusion

As it has been demonstrated by several examples, the use of DL can enhance access to education at all levels. When the four components of DL exist harmoniously, this method of delivering education can be quite successful. In fact, DL has been used in the K-12 network, higher education, and internationally to increase education opportunities for students.

When considering DL as a viable way to deliver education, the type of DL that best suits the student and the environment where the education will be delivered must be considered. There are positive and negatives associated with each type of DL and these should be carefully evaluated prior to initiating a DL program. Although DL will not be effective for every student and for every situation, it offers a way to increase accessibility to education for many people that may have previously been denied the opportunity to pursue educational opportunities.

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