Chapter 1
Foundations of Distance Education

Chapter 2
Definitions, History, and Theories of Distance Education

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Chapter 4
Technologies, the Internet for Distance Education
CHAPTER 1

Foundations of Distance Education

CHAPTER GOAL
The purpose of this chapter is to discuss the importance of distance education and the impact that distance education has on the improvement of education.

CHAPTER OBJECTIVES
After reading and reviewing this chapter, you should be able to

1. Explain why students demand to learn at a distance even though they may prefer to learn in the classroom with the teacher and their classmates.
2. Define distance education.
3. Explain Coldeway’s quadrants.
4. Discuss Richard Clark’s “mere vehicles” quote as it relates to distance education.
5. Explain how Jim Finn might compare stirrups to distance education.
6. Give examples of how distance education is being used in several locations of the world and in the United States.
7. Discuss telemedicine and relate the topic to distance education. Explain a vision for education and schooling in the future.
8. Define disruptive technology and relate distance education to this concept.

CHEMISTRY AT A DISTANCE?
A TRUE STORY

Chemistry is a hands-on, laboratory-based course that many consider one of the most rigorous in the average high school curriculum. Many students dread taking chemistry, and in many small communities there is only one chemistry teacher in the school.

Recently, four high school chemistry teachers decided that they could improve their basic chemistry course if they collaborated and team-taught. The only problem was that their schools were about 60 miles from each other.

This did not stop them, however, because their schools were connected with a fiber-optic network that permitted full-motion video signals to be sent between the four schools. The network also...
carried a high-speed Internet connection that allowed easy access to the Web.

Not only did the four teachers want to collaborate but, more importantly, they wanted their students to collaborate. To accomplish this, they decided on some basic objectives and then planned the curriculum.

The teachers decided that they would teach concepts cooperatively, act as laboratory supervisors for each other’s students, and serve as partners with student collaborators. They also decided on another important goal: to have their students cooperate across schools. Finally, they agreed that the chemistry projects should be authentic and deal with local, real-world issues.

Next, the four teachers met to plan their curriculum. They identified eight modules that could be shared among the four schools. These modules were taught by one or two of the four chemistry teachers, and required collaboration by the students from the four schools. The modules included live television instruction presented by one of the teachers, collaborative work by students who communicated with each other by television and the Internet, and class assignments that dealt with various aspects of a specific chemistry concept, such as the local ecology. Students investigated their portion of the problem and then shared results with their distant classmates. Each module ended with a live, interactive discussion, presentation, and sharing of information over the fiber-optic television network.

For all practical purposes, the students in the four schools became one large class, with subgroups of students who worked with classmates from their own school and with distant friends. The teachers served as presenters some of the time, but most often as tutors who worked with subgroups of students. The Internet and e-mail were used to keep everyone communicating outside of class, and even outside of school.

By any measure, the course was a huge success. Students learned chemistry, as evidenced by their test scores. They also discovered how to collaborate as real scientists with colleagues at distant locations, and they discovered the power of distance education to open up their school to resources available elsewhere.

Telecommunications technology made this possible. Their chemistry classroom became a “room with a view,” connected to other chemistry classrooms and to the

Increasingly, courses such as chemistry are being taught to distant and local learners synchronously and asynchronously.
resources of the world available through the Internet. The course became more like real chemistry—chemistry practiced to solve actual problems outside the school, involving experts from a number of areas brought together because of their expertise, without regard for geography or time.

Distance education is one of the most dramatic of the recent technology-based innovations influencing education. The scenario just described is only one of thousands of examples of how distance education is changing learning and teaching.

DISTANCE EDUCATION TODAY AND TOMORROW

In the last few years, distance education has become a major topic in education. In a recent year, over 60 conferences dealt with some aspect of distance education, and almost every professional organization’s publications and conferences have shown a huge increase in the number of presentations and articles related to distance education. Many educators are making grand claims about how distance education is likely to change education and training. Certainly, the concept is exciting, and recent hardware and software innovations are making telecommunications distance education systems more available, easier to use, and less costly. Distance education has begun to enter the mainstream.

Whether distance education is a mainstream form of education has been examined for several years by the Sloan Consortium. Learning on Demand (Allen & Seaman, 2010) is the seventh annual report by the Sloan Consortium; it presents the latest data about the growth and spread of online education in higher education in the United States. The first report, Sizing the Opportunity (Allen & Seaman, 2003), indicated that online and/or distance education was growing rapidly and was perceived positively by faculty and administrators. The authors of this report defined online learning to be courses where most or all of the content is delivered online. Typically, these courses have no face-to-face meetings.

One indication that online courses are a regular activity of institutions of higher education is the role of core faculty in online instruction. There has been a long-held belief that online courses are taught by adjunct professors rather than full-time staff. Growing by Degrees (Allen & Seaman, 2005) refutes this perception. It reports that about two-thirds of online courses are taught by regular faculty, a percentage that is often higher than that of regular courses taught by core faculty.

Another indicator of the growth of online education is the importance of this instructional approach to the long-term strategy of the institution. In 2009, approximately 60% of institutions indicated that online instruction was critical to their long-term plans, up from 49% in 2003. The only institutions that did not see online instruction as part of their long-term strategies were the smallest nonprofit colleges. In 2008, enrollment in online courses increased to about 4.6 million from 2 million in 2003. Growth has been continuous, often exceeding the expectations of organizational planners.

Another interesting report dealing with distance education in the Midwest was released by the Sloan Consortium (Allen & Seaman, 2007). This report indicated that:

- The 11 midwestern states represent about 15% of online enrollment, with over 460,000 students taking at least one online course in fall 2005.
- The proportion of midwestern institutions with fully online programs rises steadily as institutional size increases, and about two-thirds of the very largest
institutions have fully online programs, compared to only about one-sixth of the smallest institutions.

- Midwestern doctoral/research institutions have the greatest penetration of offering online programs as well as the highest overall rate (more than 90%) of having some form of online offering (either courses or full programs).
- The proportion of people who believe that online learning outcomes are superior to those for face-to-face learning is still relatively small but has grown by 34% since 2003, from 10.2% to 13.7%.

The Sloan Consortium reports (Allen & Seaman, 2010; Picciano & Seaman, 2007) also provide excellent criteria for distinguishing among online courses, blended/hybrid courses, and Web-facilitated courses. An online course is one where most of the content is delivered online, which means at least 80% of the course content. A blended or hybrid course combines online and face-to-face delivery; thus, 30% to 79% of the course’s content is delivered online. A Web-facilitated course uses Web-based technology, but less than 29% of the content is delivered online.

In spite of the phenomenal growth of distance education, two conflicting pressures confront distance educators (Figure 1–1). First, students say their first choice is not to learn at a distance. When asked, they say they prefer meeting with the learning group and the instructor in the classroom, the lecture hall, the seminar room, or the laboratory. Students report that they value the presence of a learning group, and that the informal interactions that occur before and after, and sometimes during, a formal class are valuable components of the total learning experience. Second, and conversely, evidence suggests that students are increasingly demanding to be allowed to learn at a distance. They want to be able to supplement,

**FIGURE 1–1** There are conflicting pressures on distance educators—students prefer to learn in a classroom, but demand to be permitted to learn at a distance.
and even replace, conventional learning experiences with distance education experiences. Learners say this is because many other considerations besides personal preferences motivate them, especially considerations about where and when they learn (Picciano & Seaman, 2007).

These opposing preferences pose a dilemma for the educational community. Should resources be dedicated to improving the traditional educational infrastructure of buildings, classrooms, laboratories, and offices? Should students be transported to these facilities? Or should money be used to develop modern and sophisticated telecommunications systems? The trend seems to be toward telecommunications. Because of advances in technology, effective educational experiences can be provided for learners, no matter where they are located. In other words, technologies are now available to develop cost-effective distance learning systems.

Virtual schools are becoming important in many locations (Berge & Clark, 2009). The Florida Virtual School, established in the late 1990s, offers a wide selection of courses (Johnson, 2007). The Arkansas Virtual School is another successful example of a state-adopted distance education program (Falduto & Ihde, 2007).
THE EFFECTIVENESS OF DISTANCE EDUCATION—IN CASE YOU WONDER

Many who begin studying distance education wonder about the effectiveness of this approach to teaching and learning, and although Chapter 3 discusses distance education research in depth, this section summarizes that research and briefly describes what we know about the effectiveness of distance teaching and distance learning.

According to the 248 studies that were compiled by Russell (1999), there is no significant difference between distance learning and traditional classroom learning. In other words, distance learning (can be) considered as effective as face-to-face learning, and our results support this conclusion. (Dean, Stah, Swlwest, & Pear, 2001, p. 252)

Russell (1999) and Dean and colleagues (2001) reported results that are indicative of the research on the field of distance education. Most who are deeply involved in the field of distance education are unsurprised by these summaries of the research. As a matter of fact, it is very clear that instruction delivered to distant learners is effective and that learning outcomes can be successfully attained when offered to students at a distance (Anglin & Morrison, 2000; Cavanaugh, Gillan, Krome, Hess, & Blomeyer, 2004; Hanson, Maushak, Schlosser, Anderson, & Sorenson, 1997; Simonson, 2002).

In 1983, Clark clearly stated that the media used to deliver instruction had no significant impact on learning:

The best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in nutrition . . . only the content of the vehicle can influence achievement. (p. 445)
After more than a decade of criticism and attempts to refute his review of over 50 years of instructional technology research, Clark (1994) once again reviewed the research on technology used to deliver instruction and noted:

> It is likely that when different media treatments of the same informational content to the same students yield similar learning results the cause of the results can be found in a method which the two treatments share in common . . . give up your enthusiasm for the belief that media attributes cause learning. (p. 28)

Since the publication of Clark’s widely distributed comments, a number of researchers have attempted to find fault with his premise. They have not been successful. It is currently the consensus that “media are mere vehicles” and that we should “give up [our] enthusiasm” that the delivery media for instructional content significantly influences learning.

Unfortunately, some have misinterpreted the “no significant differences” phenomenon and assumed that instructional technology and distance education do not promote learning. This is incorrect. Actually, the evidence is quite clear that students of all ages can learn from instruction delivered using technology, and that distance education works.

In the first years of widespread growth of distance education in the United States, Hanson and colleagues (1997) summarized the research on distance education in a publication of the Association for Educational Communications and Technology. This widely distributed review concluded that

> comparative research studies on achievement tend to show no significant difference between different delivery systems and between distance education and traditional education. . . . Several recent studies indicate a significant higher achievement level in those learning at a distance. . . . The accepted position is that the delivery system affects no inherent difference on achievement. (p. 22)

In other words, it is not the fact that instruction is delivered in a traditional, face-to-face environment or at a distance that predicts learning (Anglin & Morrison, 2000; Berge & Mrozowski, 2001; Darwazeh, 2000; Simonson, 2002).

It is clear from the research literature that distance education works (e.g., Hanson et al., 1997; Simonson, 2002). Why it works and how it works are important concepts to understand, however. The following conclusions about instruction delivered to distant learners are directly related to effectiveness:

- Training in effective instructional strategies is critical for teachers of distant learners.
- Distance education courses should be carefully designed and developed before instruction begins.
- Visualization of ideas and concepts is critical when designing instruction to be delivered to distant learners.
- Adequate support systems must be in place to provide the distant learner with access to resources and services.
- Interaction between the instructor and students and among students must be possible and encouraged.
- Assessment should be designed to relate to the specific learning outcomes of the instructional experiences.
Distance education efforts are increasingly being concentrated on K-12 education.

In summary, distance education can be as effective as any other category of instruction. Learning occurs and knowledge is retained. Students report that they have learned and that they feel their distance learning experiences are as successful as more traditional education. The keys to successful distance education are in the design, development, and delivery of instruction, and are not related to geography or time.

WHAT IS DISTANCE EDUCATION?

It is the nature of questions that they are easier to ask than to answer. This is true of the question “What is distance education?” for several reasons. First, distance has multiple meanings, although this book advocates the definition presented earlier and in Chapter 2. Distance can mean geographical distance, time distance, and possibly even intellectual distance.

Second, the term distance education has been applied to a tremendous variety of programs serving numerous audiences via a wide variety of media. Some use print, some use telecommunications, and many use both. Finally, rapid changes in technology challenge the traditional ways in which distance education is defined.

Dan Coldeway, of South Dakota’s Dakota State University, provided a framework useful in helping to define four ways in which education can be practiced. This framework, which considers the two variables of time and place, gives insight into different approaches to the practice of education and distance education. Combinations of time and place result in four approaches to education: same-time, same-place education (ST-SP); different-time, same-place education (DT-SP); same-time, different-place education (ST-DP); and different-time, different-place education (DT-DP).
Traditional education takes place at the same time in the same place. This is typically the regular self-contained classroom that most often is teacher centered. Different-time, same-place education means that individual learning occurs in a learning center, or that multiple sections of the same classes are offered so students can attend the class in the same place at a time they choose. This is education that is available at different times to students but in the same place, such as the media center or computer laboratory.

The last two categories focus on education occurring in different places. Instruction can take place in different places at the same time when telecommunications systems are used. Often, television is used to connect the local classroom with the teacher and students to learners at a distance. Satellite, compressed video, and fiber-optic systems are increasingly used for same-time, different-place education. This approach is also called distance learning. Students can also learn at different times and in different places. Simonson (2003) has said that the purest form of distance education occurs at different times and in different places. In other words, learners choose when and where to learn and when and where to access instructional materials. Recently, Web-based courses have been offered to learners anywhere they have access and whenever they choose. This approach is called asynchronous distance learning.

**FACTS ABOUT DISTANCE EDUCATION**

Here are a few little-known facts about the field of distance education.

- Eminent historian Frederick Jackson Turner ran the correspondence program of the University of Wisconsin in the late 1800s.
- The state of Iowa has a state-owned, 3,000-mile fiber-optic network, called the Iowa Communications Network, with nearly 1,000 high-tech classrooms for the purpose of offering distance instruction throughout the state.
- *Telemedicine* refers to medicine at a distance, and *telelaw* refers to law at a distance.
- Research on the effectiveness of distance education clearly shows that students who learn at a distance do not learn any worse, or any better, than traditional students.
- The United States Distance Learning Association is a professional organization of those involved in distance education.
- Universities such as the University of Chicago, the University of Wisconsin, and the University of Iowa championed correspondence education in the later years of the nineteenth century and early in the twentieth century.
- Satellites used for distance education orbit approximately 23,000 miles above the equator at an orbiting speed that matches the rotation of the Earth. This geosynchronous orbit makes these satellites appear to be stationary on the surface of the Earth. The location where the satellites orbit is called the Clarke Belt, after science fiction writer Arthur C. Clarke, who wrote about communication satellites in geosynchronous orbit in a story published in the 1940s.
- The foundations of the Internet were begun by the U.S. Department of Defense and by a number of research universities as a way to share scientific and technical information between scientists.
- *IP* stands for *Internet Protocol*, the rules used to send information over the Internet.
CHAPTER 1  ■  FOUNDATIONS OF DISTANCE EDUCATION

The Internet is a packet-switched network, meaning that messages are divided into packets that are disassembled and then sent to the distant site where the packets are reassembled into the complete message.

Star Schools is the name of a program of the U.S. Department of Education that funds the implementation of distance education in schools and colleges in the United States. The term was coined by Senator Ted Kennedy, who was opposed to the use of satellites for “star wars,” so he advocated the use of satellites for education and proposed the Star Schools program.

Distance Education as a Disruptive Technology:

A disruptive technology or disruptive innovation is a technological innovation, product, or service that eventually overturs the existing dominant technology or product in the market. Disruptive innovations can be broadly classified into lower-end and new-market disruptive innovations. A new-market disruptive innovation is often aimed at non-consumption, whereas a lower-end disruptive innovation is aimed at mainstream customers who were ignored by established companies. Sometimes, a disruptive technology comes to dominate an existing market by either filling a role in a new market that the older technology could not fill or by successively moving up-market through performance improvements until finally displacing the market incumbents. (Simonson, 2010, p. 74)

By contrast, “sustaining technology or innovation” improves product performance of established products. Sustaining technologies are often incremental.” Sustaining technologies maintain a rate of improvement, give users something more or better that they value (Teets, 2002).

Thus, technological innovations might be categorized along a continuum from sustaining to disruptive. In education, a sustaining technology might be a SmartBoard, which in most applications is a way to present information dynamically and efficiently—a sustaining upgrade to the chalkboard and overhead projector.

As a matter of fact, most attempts to integrate instructional technology into the traditional classroom are examples of sustaining technologies—computer data projectors, DVD players, e-books—all of which “improve product performance of established products.” Most integrated technologies sustain, and do not disrupt.

On the other hand, distance education is certainly not a sustaining technology. Rather, distance education, virtual schooling, and e-learning are disruptive.

For example, distance education is aimed at students (older, working, remotely located learners) who are “ignored by established companies” (traditional schools). Distance education presents a different package of performance attributes that are not valued by existing customers. Distance education has come to “dominate . . . by filling a role . . . that the older technology could not fill”(Teets, 2002, p. 7).

Clayton Christensen (2003) and Christensen, Anthony and Roth (2004) have written extensively about the concept of disruptive technologies. Christensen’s work has been widely embraced in business. His work helps explain why some established industries fail, and others spring up, seemingly from nowhere. There is no better example than the personal computer. Not a single mini-computer manufacturer has been a successful manufacturer of personal computers—they did not see the power of the new technology until others had captured market share.
Similarly, most educators have ignored the potential of looking at the ideas behind Christensen's theory, and how disruptive technologies might transform education and training.

In Florida, there is a mandate that every public school district must establish a virtual K–8 and 9–12 school (Simonson, 2009). Many have wondered why Florida legislators would pass such a sweeping law—perhaps the answer is disruptive technology. Whatever the reason for Florida to establish virtual schools, it is clear that distance education and virtual schooling are disrupting traditional education, and this may be a good thing. It might be a good idea for educators to become more cognizant of Clayton Christensen's work, and the power of disruptive technologies to change education.

MEDIA IN EDUCATION: EARLIER DEBATES

The discussion about distance education is somewhat reminiscent of a recent debate in the educational technology field referred to previously that began when Richard Clark (1983), a researcher and theorist, published a classic article containing his now famous “mere vehicles” analogy.

Clark (1983) summarized over six decades of educational media research. It was obvious to him that many researchers were reporting about flawed studies involving media. Clark believed that many educators did not understand the last 60 years of research about media and learning.

Even more alarming was that many practitioners were making unrealistic claims about the impact of technology on learning. According to Clark, a large segment of the educational community felt that media-based instruction was inherently better than teaching when media were not used.

In 1983, Clark wrote in the *Review of Educational Research* that:

> the best current evidence is that media are *mere vehicles* that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in nutrition . . . only the content of the vehicle can influence achievement. (p. 445)

Clark’s (1983) article went on to claim convincingly that instructional media were excellent for storing educational messages and for delivering them almost anywhere. However, media were not responsible for a learning effect. Learning was not enhanced because instruction was media based. Rather, the content of the instruction, the method used to promote learning, and the involvement of the learner in the instructional experience were what, in part, influenced learning. Although many did not, and still do not, agree with Clark, his article caused a reassessment of how educators looked at the impact of media. Clark 1994 continued to implore the education community to “give up your enthusiasm for media effects on learning,” which was the theme of an additional publication on this topic. “Give up your enthusiasm” has become the new rallying cry for those who do not believe there is a media effect.

Certainly, some distance educators claim that distance education is the best way to learn because it allows students to acquire knowledge when it is most relevant to them.
However, most who have studied distance learning make few claims about the
approach being better. Rather, they say it is a viable and important approach to learn-
ing and teaching that should be one option of many available.

A second analogy by another great technology pioneer also has relevance to
distance education. In the 1960s, Jim Finn from the University of Southern California
talked about the stirrup as a technological innovation that changed society. He often
told a story that went like this:

The Anglo-Saxons, a dominating enemy of Charles Martel’s Franks, had the stirrup
but did not truly understand its implications for warfare. The stirrup made possible
the emergence of a warrior called the knight who understood that the stirrup enabled
the rider not only to keep his seat, but also to deliver a blow with a lance having the
combined weight of the rider and charging horse. This simple concept permitted the
Franks to conquer the Anglo-Saxons and change the face of western civilization. Martel
had a vision to seize the idea and to use it. He did not invent the stirrup, but knew how
to use it purposefully. (Finn, 1964, p. 24)

Finn (1964) summarized the implications of this story as follows:

The acceptance or rejection of an invention, or the extent to which its implications are
realized if it is accepted, depends quite as much upon the condition of society, and upon
the imagination of its leadership, as upon the nature of the technological item itself. . . .
The Anglo-Saxons used the stirrup, but did not comprehend it; and for this they paid
a fearful price. . . . It was the Franks alone—presumably led by Charles Martel’s genius—
who fully grasped the possibilities inherent in the stirrup and created in terms of it a new
type of warfare supported by a novel structure of a society that we call feudalism. . . . For
a thousand years feudal institutions bore the marks of their birth from the new military
technologies of the eighth century. (p. 24)

What Clark strongly proposed with his “mere vehicles” and “give up your enthu-
siasm” arguments was that media and technology did not directly affect learning. He
forcefully argued that educators should not claim that technology-based learning,
such as modern distance education systems, had any inherent advantage (or disad-
vantgage for that matter) over other methods of learning. Like Finn, Clark proposed
that technologies might provide ways of accomplishing tasks that are new and not
readily obvious. Finn advocated that practitioners should attempt to identify unique
approaches for change by using new technologies in new ways. Finn’s story explained
that the stirrup not only made getting on and off a horse easier but it also made pos-
sible a new, previously unheard-of consequence—the emergence of the knight—and
it was the knight who caused significant and long-lasting changes in society. Perhaps
the correct application of distance education will significantly change and restructure
learning and teaching on par with the societal change—called feudalism—
needed to support the knight.

The implication of the arguments of these two educators is that when new
technologies emerge, they often allow users to be more efficient. However, it is not
technologies themselves that cause changes; rather, changes occur because of
new ways of doing things that are enabled by technologies. The stirrup made riding
horses easier and more efficient, but it was the knight who changed medieval society.
STATUS OF DISTANCE EDUCATION

Worldwide Examples

Distance education has a major and varied impact worldwide. Whereas politics and economics influence how distance education is employed, a strong demand exists in the world for distance education opportunities. The five examples that follow illustrate some of the factors that influence distance education and show the demand for distance learning opportunities.

1. Anadolu University in Turkey reaches over 500,000 distance education students, which makes it the largest university on Earth, according to the World Bank (Demiray, 2005; Macwilliams, 2000). The university was created in 1981 during a sweeping reorganization of Turkey’s higher education system. Its mission is to provide distance instruction to the citizens of Turkey. In 1983, it had almost 30,000 students in business administration and economics, making the university an immediate success. As of 2010, approximately 34% of the students who enrolled in the two-year degree programs graduated in two years, and about 23% of those enrolled in four-year programs graduated in four years. The vast majority of the students enrolled at Anadolu University were working adults with full- or part-time jobs. Distance education offered by Anadolu University has made postsecondary education a possibility for many in Turkey who would not have access to higher education. Professors at Anadolu publish an online journal that can be accessed at http://tojde.anadolu.edu.tr.

2. The Open University of Hong Kong opened in 1989 to serve residents of that huge metropolitan area. The university has begun to market itself to learners in China, and it has thousands of students from the mainland (Zhang, 2006). Unlike Hong Kong’s eight conventional universities, the Open University accepts all applicants. It has had over 100,000 students, of which approximately 10% have graduated. Administrators from the Open University of Hong Kong plan to offer distance education throughout China and Southeast Asia (Zhang, 2005; Zhang, Perris, & Yeung, 2005).

3. In sub-Saharan Africa, political instability and economic depression have caused a decline in educational standards in some countries. As the population increased in these countries, a tremendous classroom shortage emerged, and both the number of qualified teachers and the availability of instructional materials became inadequate. Distance education is seen as having the potential to contribute to national reconstruction by providing economically feasible educational opportunities to many people. Collaboration with a variety of international distance education organizations has provided expertise and support for the field. As a result, distance education at a basic level, as it is practiced in many regions of Africa, has expanded quite sharply. However, although growth in distance education in sub-Saharan African countries is evident, it does not yet have a wide impact. Lack of funding prevents distance education institutions from reaching many potential students (Day, 2005; Visser, Visser, & Buendia, 2005; Visser & West, 2005). According to Nsomwe-a-nfunkwa (2009), the enrollment in the French Digital Campus of Kinshasa (Congo) more than doubled from 2004 to 2008.
4. China developed a national higher distance education program in the late 1970s and early 1980s in response to a growth in population and a high cost per capita for the craftlike approach to regular higher education in the country. Because China could not afford to meet the higher education needs of the expanding population, a national radio and TV university system was developed. By 1985, China had over 30,000 TV classes throughout the country and employed almost 25,000 academics. One in five students studying in higher education was enrolled in a radio and TV university. This national system incorporated a centralized approach to course development, delivery, and examinations. However, despite an increase in offerings, student numbers have significantly decreased. Recently, only 1 in every 13 students in higher education was enrolled in a radio and TV university and this prompted a move from TV broadcasting to e-learning (Gao & Zhang, 2009).

Socioeconomic factors have caused changes in the mass market for higher education in China. The centralized approach to course development and delivery no longer meets the diverse needs of learners and does not adapt itself quickly to the new conditions. In response, China’s radio and TV universities have changed from a central system of course development and delivery to a regionally responsive system that provides a wide variety of both diploma and nondiploma courses (Ding, 1994, 1995; Hurd & Xiao, 2006; Yang, Wang, Shen, & Han, 2007; Yan & Linder, 2007).

5. Distance education has had a long history in European countries. The continuation of this tradition is evident in the vast array of programs offered by European Union countries. In some countries, open distance teaching universities offer the majority of the country’s online education programming. Spain’s Universidad Nacional de Educación a Distancia is Europe’s largest distance teaching university, with a current enrollment of about 130,000 students. In other countries, traditional universities deliver the majority of the courses. France, for example, has no national distance teaching university, but offers higher distance education through 22 offices within traditional universities. Recently, 34,000 students were enrolled in these programs. In some cases, governments provide substantial distance education training opportunities that do not lead to a university degree. France is a leader in this area, providing over 350,000 students a year with opportunities at a range of levels: elementary school, high school, technical and professional qualifications, teacher training, and university-level and postgraduate courses. Distance instruction in the European Union uses a wide variety of media to deliver courses. These range from traditional correspondence delivery, to computer conferencing, to two-way audio and video virtual classrooms (Holmberg, 1995; Keegan, 1995). Using these technologies, the established distance education and training organizations of Europe will continue to play a significant role in education in and beyond the European Union (Vrasidas, 2008).

United States
Distance educators are often asked about the quality and extent of online education in the United States. Many individuals, especially new students, want to know if instruction delivered at a distance is of high quality, and if distance education is a passing fad
or a viable approach to teaching and learning. The Sloan Consortium has attempted to answer these questions. The Sloan Consortium is a collection of institutions and organizations committed to quality online education. Their reports (Allen & Seaman, 2010) provide a wealth of information about the field of distance education in general, and about online instruction more specifically.

The Sloan reports used surveys to obtain information related to four fundamental questions:

1. Will students embrace online education as a delivery method?
2. Will institutions embrace online education as a delivery method?
3. Will faculty embrace online education as a delivery method?
4. Will the quality of online education match that of face-to-face instruction?

Almost 1,000 surveys set by the Sloan Consortium (about 33% of those sent) were returned from chief academic officers from accredited degree-granting institutions of higher education in the United States. The Sloan report is interesting reading, and the results are important, if not surprising, to those in the field:

- The majority of chief academic officers believe that the learning outcomes in online courses will equal or exceed that of face-to-face courses within 3 years.
- The overall growth rate for enrollment in online courses is expected to be 20%.
- Profit institutions expect a growth rate that is faster than that of other institutions (40%).
- Private, nonprofit institutions expect to use online education less than other institutions.
- Given an option, students will enroll in online courses.
- Overall, attitudes of faculty remain conservative about the quality of online education.

Other interesting results from the Sloan Consortium Survey (2010) show that over 90% of public universities offer online courses, and about half offer degree programs online. About 85% of public universities consider online education critical to their long-term academic strategies, as compared with about 50% for private institutions. Faculty at public universities are more accepting of the value of online education than their colleagues at private universities, and public universities enrolled over 2 million students in online courses.

The Sloan Consortium reports authenticate the amazing growth of distance education, yet they also identify the very important issues that still confront the field if distance education is to continue to grow in importance.

At the university level, it is reported that distance education enrollment is in the high six figures nationally. This includes enrollment in courses offered by traditional universities and those offered by distance learning universities. The U.S. military is heavily involved in distance education technology because it is viewed as a cost-efficient way to deliver technical training to a large number of soldiers. The development of new weapons systems and other technologies increases the demand for this type of training. The army's Interactive Teletraining Network, the navy's Video...
Teletraining Network, the air force’s Teleteach Expanded Delivery System, and NASA’s Digital Learning Network (Tally, 2009) all provide distance training opportunities for personnel across the United States and around the world.

A focus on education in primary and secondary schools separates American distance education from traditional European distance education. This emphasis on kindergarten through grade 12 (K–12) students is demonstrated by the growth of virtual schools (Berge & Clark, 2005) and in the federally funded Star Schools projects. The U.S. Department of Education began the Star Schools program “to encourage improved instruction in mathematics, science, foreign languages, literacy skills, and vocational education for underserved populations through the use of telecommunications networks” (Simonson, 1995, pp. 3–4). Although these projects are not limited to K–12 programming, their primary emphasis is on K–12 students and teachers. A variety of network technologies including satellite, cable, telephone networks, fiber optics, microcomputer-based laboratories, multimedia, and electronic networking technologies have been used to deliver instructional programming to over 6,000 schools nationwide through the Star Schools project (U.S. Department of Education, 1995).

Typically, the Star Schools project has funded programs that provide satellite delivery of instruction to a large number of students in many states. One of the largest is the Star Schools Project of the Los Angeles County Office of Education, which is a consortium of education and public television agencies in over 10 states. The consortium provides math, science, social science, language arts, and technology programming to over 1,300 school sites and 125,000 students in grades 4 through 7. In addition, the project provides professional development opportunities for over 4,000 teachers. The Star Schools project funds a number of similar satellite-based projects.

The Star Schools project has sponsored several special statewide projects that fund the development of statewide infrastructures, allowing for synchronous interaction between students and instructors. The most comprehensive is in Iowa. Currently, Iowa’s 3,000-mile statewide fiber-optic network connects more than 700 educational sites, with over 300 more sites to be added in the next few years. Hundreds of thousands of hours of K–12 programming are provided each year, in addition to teacher professional development and higher education course opportunities. Kentucky and Mississippi have joined Iowa in developing statewide systems that promote personalized interactive instruction and learning.

South Dakota is another state that has significantly committed to distance education for K–12 students. The Digital Dakota Network links every school building to a compressed video network. Over 300 sites are located throughout the state (Figure 1–2). Teachers have been trained in special month-long distance teaching and learning academies, and teachers and university faculties have designed curriculum materials, including entire courses. South Dakota educators have also conducted major research and evaluation activities to document the impact of distance education in the state (Bauck, 2001; Simonson, 2005). As the examples show, distance education has a major impact worldwide. In addition to economics and politics, the growth and impact of distance education is directly
FIGURE 1–2  South Dakota has the Digital Dakota Network that links hundreds of sites in the state for interactive instruction.


linked to the availability of new technologies. “As technology links distant sites in an electronic web of information and new communication channels, people around the globe are pulled together” (Thach & Murphy, 1994, p. 5). This type of communication has contributed to globalization. Globalization implies that people are connected more or less contemporaneously with distant events. The new computer-mediated communications and telecommunications technologies contribute to globalization.

Other significant distance education initiatives are Network Nebraska (Decker, 2008), Western Governors University (Eastmond, 2007), Capella University (Thornton, 2007), and Walden University (Shepard, 2008). Distance educators will be challenged both by globalization and by the emerging technologies. How they take advantage of these opportunities will give new meaning to the practice of distance education.

Accreditation.  Many people in traditional education worry about the quality of distance education programs. Some have called distance education institutions diploma mills, especially those programs that generate profits. A diploma mill has the
following characteristics: no classrooms, untrained or nonexistent faculties, and unqualified administrators with profit as their primary motivation (Simonson, 2004).

Legitimate institutions have expended considerable effort to demonstrate the quality of their distance education programs. One of the most important activities involves accreditation. Probably the most important form of accreditation, which involves in-depth scrutiny of a school or college’s entire program by outside evaluators, comes from regional accrediting agencies, such as the North Central Association (NCA) and the Southern Association of Colleges and Schools (SACS). The NCA and SACS are examples of regional agencies that accredit institutions in their geographic areas. Generally, the same standards are applied to traditional and distance education programs. National accreditation agencies also accredit colleges.

TELEMEDICINE

Tele- means “at a distance,” so in its simplest form, telemedicine is defined as medicine at a distance. The Institute of Medicine defines telemedicine as the use of electronic information and communications technologies to provide and support health care when distance separates the participants (Grigsby & Sanders, 1998). Grigsby and Sanders (1998) define telemedicine as the use of telecommunications and information technology to provide health care services to persons at a distance from the provider. Actually, there exist in the literature dozens of definitions of telemedicine, but all contain these components:

1. Separation or distance between individuals and/or resources
2. Use of telecommunications technologies
3. Interaction between individuals and/or resources
4. Medical or health care

Also, it is implied in most definitions that telemedicine refers to health care offered by recognized, formally accredited medical organizations. Organizational affiliation differentiates telemedicine from self-diagnosis, unsanctioned medical treatment, and quackery.

Background

The term telemedicine has become common in medical literature during the last decade. However, most give credit for originating the term to Kenneth Byrd, who, along with several other physicians, formed a video microwave network in 1968 from Massachusetts General Hospital to Boston’s Logan Airport. There were a number of other projects at about the same time, but this effort is considered the modern launching of the concept of telemedicine.

Telemedicine is a growing field within the profession of medicine. It has journals, such as the Journal of Telemedicine, Telemedicine Today, and Telemedicine and e-Health, has a professional association (the American Telemedicine Association, http://www.atmeda.org/), and holds an annual professional meeting.

Articles dealing with various aspects of telemedicine can be found in the journals of the various subdisciplines of medicine, and scientific research is being
Interactive telecommunications technologies expand the specialized information available to doctors.

Physicians can consult with specialists using desktop video conferencing systems.

Mobile videoconferencing systems increase access to medical information anywhere it is needed.

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conducted and reported with increasing frequency in prestigious journals of the profession. Finally, federal and state governments and private organizations are funding telemedicine projects totaling tens to hundreds of millions of dollars. The communications revolution is having an impact on medicine just as it is on education, training, government, business, and law (Tulu, Chatterjee, & Maheshwari, 2007).

Applications

Kvedar, Menn, and Loughlin (1998) list four major applications for telemedicine: remote consultation, remote monitoring, remote education, and telementoring.

Remote consultation is the most common telemedicine application and what most refer to when they use the term telemedicine. This application implies one health care provider seeking the advice of a professional colleague or subspecialist to resolve a patient’s problem.
Remote monitoring is a long-standing application where the most common use is to access a patient's vital signs at a distance using telecommunications technologies. Remote education is increasingly important as the geographically concentrated expertise of a medical unit is redistributed to isolated practicing professionals and professionals in training. Telementoring involves the development of techniques to share the output of surgical tools such as endoscopes and laparoscopes with distant locations.

The Institute of Medicine (Grigsby & Sanders, 1998) organizes applications of telemedicine differently and identifies five areas of emphasis: patient care, professional education, patient education, research, and health care administration.

Impediments to Telemedicine

The Institute of Medicine identifies five concerns that prevent and slow the growth of telemedicine: professional licensure; malpractice liability; privacy, confidentiality, and security; payment policies; and regulation of medical devices.

Professional licensure issues stem from the traditional view of professional practice as involving a face-to-face encounter between clinician and patient. Telemedicine breaks the physical link and may complicate where a telemedicine practitioner should be licensed if the professional and the patient are in different states. Currently, multiple state licenses are required.

Malpractice liability is usually described as a deviation from the accepted medical standard of care. For telemedicine practitioners, the subject of malpractice presents potentially complicated legal issues, since state law generally governs liability.

Privacy, confidentiality, and security issues relate to serious questions that have been raised about current legal protections for medical privacy and confidentiality. The Hippocratic oath requires that physicians keep silent about what they learn from patients, “counting such things to be as sacred secrets.” Information and telecommunications links present new opportunities for privacy infringements.

Payment policies for telemedicine are a major barrier to the growth of telemedicine. Until 1999, telemedicine did not meet the requirements of the Health Care Financing Administration (now known as the Centers for Medicare and Medicaid Services) for in-person, face-to-face contact between providers and patients. Although most medical consultations using telemedicine have been ineligible for payment in the past, guidelines for reimbursement are still evolving. Currently, Medicare covers interactive video systems (Grigsby & Sanders, 1998), and for this reason most health care organizations are using two-way videoconferencing for their initial telemedicine initiatives.

Regulation of medical devices is of concern because the federal Food and Drug Administration (FDA), through its center, regulates some of the devices used in telemedicine.

In summary, the issues that have slowed the growth of telemedicine are important and should be addressed. However, they are not necessarily unique within the medical
professions. Rather, they are issues that are resolved continuously as the health care field adopts new technologies, both medical and informational.

Limited research is reported on the medical effectiveness and cost effectiveness of telemedicine. Current research seems to support the conclusion that telemedicine is effective when practiced correctly but additional evaluation and assessment activities need to be conducted (Grigsby & Sanders, 1998).

Telemedicine will continue to be a dynamic influence within the profession of medicine. The benefits of this innovation will be in two primary areas: medical benefits and cost benefits. First, telemedicine is a logical extension of the growth of the technical and technological aspects of health care. The medical benefits of an active telemedicine program are related to how professionals use the technology. A modification of a famous analogy used in educational research when applied to telemedicine summarizes the medical impact of telemedicine. Telemedicine and information technologies are mere vehicles that permit the delivery of health services, but they have no greater impact on health care than, as Clark said, the truck that delivers our groceries has on nutrition. It is the content of the vehicle that permits effective health care, not the vehicle itself (Clark, 1983). Second, cost effectiveness is likely to be the most significant outcome of telemedicine. The significant costs of medical care and the increased requirements for services that are projected for the next several decades forecast a cost advantage for the organizations that understand and utilize technologies effectively. Certainly, telemedicine is only one category of technology, but it may soon be the “ears and eyes” of the health care organization.

In summary, telemedicine is a recognized subcategory of the health services profession. As a technique and tool in the modern medical center it has the potential to expand and accelerate the services offered and the impact made. Other professions, such as law, are moving cautiously to adopt distance education concepts. Nova Southeastern University’s law school was recently recognized as the “nation’s most wired law school.” Telecommunications technologies will have increasing impact on most fields of endeavor, not just education, as they improve and become more widely available.
CHARACTERISTICS OF DISTANCE EDUCATION: TWO VISIONS

Recently, a number of advances have been made in the study of learning and teaching that are providing educators with strategies for improving the educational experience. Often, these advances are considered to be in opposition to the common practices of distance education because of the misconception that teachers lecture to distant learners. This is changing dramatically, however, as distance education systems attempt to provide a learning site that is a "room with a view."

The First Scenario: Distance Education in Schools

This emerging approach relies strongly on distance education and suggests a scenario for the school and classroom of the future similar to the following scenario, which implies that classrooms of the future will be rich in technology and will continue to have teachers who are responsible for the learning events that occur:

In every community and neighborhood there are schools surrounded by playgrounds and sports fields with trees and grass. The schools themselves look modern but very familiar. The schools are open 24 hours a day, every day, all year. Each is a part of a locally controlled and supported district that is one of several hundred that make up a technology-rich statewide educational system. Classrooms are considered rooms with a view. Every learner and teacher possess a high-powered multimedia computer that is connected to a worldwide network containing virtually unlimited educational resources. The network connects the learner to multisensory multimedia resources that are accessible from school, home, and business. Education is learner and learning centered and technology supported. Schools are small, with about 600 to 800 students, and classes never exceed 25. In the evenings the classrooms are converted to learning laboratories that are used by the entire community. Each classroom has full-motion video links to state and national networks that permit true interactive learning. Students also have desktop video access through their computers. The educational philosophy of this school is to promote authentic, student-centered learning activities that are cognitively situated whenever possible in real-world events. The school and its classrooms are a community resource. Outside of school, students continue to learn, even when on vacation. A robust network connects students to their teachers and to the resources needed for learning. Schools provide computers when students need them, and the high-speed network is a free wireless canopy that covers the community.

This scenario could be considered a dream rather than a vision. However, it is based on the following widely available and generally accepted techniques and technologies. First, instruction is learner centered. The networked computer permits the learner to access events of instruction that can be tailored to meet individual needs. Second, multimedia instruction is routine, especially when networked computer and video systems are used. Interactive instruction is possible because telecommunications technologies permit the learner to contact databases, information sources, instructional experts, and other students in real-time and interactive ways. For example, individual students can use their computers to contact other students or individuals who have information they need. Also, the entire class can participate in interactive video sessions with teachers from remote sites or with groups of students from other
schools. Instruction is authentic because it is not teacher centered; rather it is content and learner centered.

The teacher orchestrates the individual learning activities of students who collaborate with classmates, distant learners, the teacher, and multimedia technology available locally or from the Web. Finally, the learning environment of the future encourages collaboration without the limitations inherent in the self-contained classroom.

The Second Scenario: Distance Education in the Corporation

The corporation headquarters looks like an inviting place to work. When employees report to work they find that every office has a large flat-panel display connected to a small, nearly invisible powerful computer that is connected to a high-speed local and wide area network. Also connected to the computer is a small, high-quality video camera with microphone and speakers. The office looks modern but familiar. It is one in a cluster that constitutes the on-site work sites of a team of seven professionals. At any one time only a few of the office cubicles have someone in them, but in all cases they are easily seen on the displays in the home offices of physically missing employees. The work group is continuously connected for the sharing of video, audio, and information.

The computer network is connected to online resources that permit “just-in-time” access to information and data. Members of the team effortlessly work with colleagues in
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Students can easily interact with students and teachers from remote sites using videoconferencing.

the work group without regard for their physical location, and other teams can be contacted with the click of a mouse button. Employees are provided with high-speed, wireless handheld devices that keep them connected to each other and to the resources needed to conduct business.

Office cubicles are located near a conference room that contains an interactive telecommunications system that can be connected to other systems using a variety of networking protocols. This room is used for training when group interaction is important. Large, flat-panel television displays permit easy viewing and simple yet powerful cameras and microphones facilitate group interaction at a distance. The classroom is connected to a bridge that can connect dozens of sites, including the locations of those working at home or employees who are in the field.

At home, members of the team have similar configurations of technology, although the settings are much less formal and more varied. Working at home is encouraged.

The office of tomorrow will have readily accessible videoconferencing systems.
Industries bring distance education technologies right to the worker on the plant floor.

Of critical importance to the work group is access to training, which is a continuous need. Learning about new products, new ideas, and new approaches is a regular requirement of the job. Training is conducted synchronously and asynchronously by trainers who are part of the corporate training team, and by outside experts who are brought in electronically when their specific skills are needed. Learning objects are used by corporate trainers to design instructional packages that are offered over the network to employees of the corporation. Training events are archived for later review.

Training is technologically based, highly visual, and available on demand. The employees of the corporation have access to trainers whenever training is needed. Trainers work in teams, and have access to a wealth of resources, including subject-matter experts from inside and outside the company. Trainers are a corporation resource who provide training at a distance to the members of the corporate community. Information and training are as important to the corporation as are products and sales.

The criminal justice system is using videoconferencing to reduce the need to travel.
Businesses will increasingly have access to seminar rooms that use videoconferencing.

Why scenarios? Much of this is possible because of the concept of distance education, which is the bringing of learners and the content of instruction together no matter where each is located. Interactive, real-time, on-demand, learner-centered, authentic, and learner-constructed events will characterize the educational environment of the future. Ultimately, the concept of distance will disappear as insignificant, and the idea of interaction will replace it.

The home office will use videoconferencing to keep employees and their colleagues connected.
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SUMMARY
Separation of the student and the teacher is a fundamental characteristic of distance education. More often, educators are using technology to increase the access of the distant learner to the local classroom, to improve access of all learners to resources, and to make the experience of the remote student comparable with the experience of the local learner.

Distance education is a dramatic idea. It may change, even restructure, education, but only if it is possible to make the experience of the distant learner as complete, satisfying, and acceptable as the experience of the local learner. If distance education is to be a successful and mainstream approach, then it is imperative that distance education systems be designed to permit equivalent learning experiences for distant and local students. Distance education using telecommunications technologies is an exciting emerging field. However, practitioners should not promote this type of education as the next great technological solution to education’s problems, nor make grand claims about the impact of telecommunications systems. Rather, distance education specialists should strive to understand technology and technological approaches that make the experiences of distant and local learners positive and equivalent, at least until someone’s genius identifies an approach to learning using telecommunications systems to change education, just as Charles Martel’s use of the stirrupc changed society.

DISCUSSION QUESTIONS
1. What are Coldeway’s quadrants, and which quadrant did Coldeway consider the purest form of distance education? What are the pros and cons of dividing educational events into one of Coldeway’s four categories?
2. What is the fundamental characteristic of distance education? Discuss what this means. What are the various kinds of distance?
3. Learners prefer not to learn at a distance. Explain.
4. Richard Clark says media are “mere vehicles that deliver instruction but do not influence student achievement.” Discuss Clark’s analogy and decide if it is accurate. Are media vehicles? What does the word mere imply?
5. What do stirrups and distance education have in common? Discuss the concept of innovations and how they are used or not used. Has the computer changed teaching and learning?
6. Write a vision for a school 10 years from today.

REFERENCES
CHAPTER 1  ■  FOUNDATIONS OF DISTANCE EDUCATION


Ding, X. (1994). China’s higher distance education—Its four systems and their structural characteristics at three levels. Distance Education, 15(2), 327–346.


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Simonson, M. (2010). Distance education as a disruptive technology. Distance Learning, 7(1), 74–73.


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SUGGESTED READINGS


