Michael G. Moore (Ph.D., University of Wisconsin-Madison)

Michael G. Moore is known in academic circles for leadership in conceptualizing and developing the scholarly study of distance education. In 1972 he published the first statement of theory about distance education in English, and has achieved a number of other notable "firsts" in this field. While teaching the first course in this subject at University of Wisconsin-Madison in the mid-1970s, he was contributory to founding the national annual conference there. Coming to Penn State in 1986, where he now holds the rank of Distinguished Professor in the College of Education, he established the American Center for Study of Distance Education. He founded the first American journal (*American Journal of Distance Education*), established the first sequence of taught graduate courses, a national research symposium, a popular online community of interest (Distance Education Online Symposium), and a national leadership institute. In recent years he has designed and now teaches graduate courses online for Penn State's World Campus. Originally trained as an economist and grounded in an early adult education career of seven years in East Africa, Moore maintains a special interest in economic and social development, undertaking numerous research, evaluation, and training projects for the World Bank, the IMF, UNESCO, and several national governments. In 2002 Moore was inducted into the United States Distance Learning Association's Hall of Fame. In 2008 he was appointed Visiting Fellow at University of Cambridge and Visiting Professor at the UK Open University. In 2010 he was appointed Senior Fellow by the European Distance Education Network (EDEN) and 2010 also saw him awarded an Honorary Doctorate by Mexico's University of Guadalajara.

Greg Kearsley (Ph.D., University of Alberta)

Greg Kearsley is the director of online graduate studies at the University of New England. He has taught at the University of Maryland, Nova Southeastern University, and the George Washington University, as well as developed online courses for many organizations including NCREL, Walden Institute, and the University of Wisconsin. Dr. Kearsley has written more than 20 books on the subject of technology.

Basic Concepts

In this chapter we will introduce some basic ideas about distance education. We will provide a definition and an explanation of its various levels of organizational complexity. We will also explain what we mean by a systems approach and why it is a key to understanding distance education as well as to successful practice.

The basic idea of distance education is simple enough: Teachers and students are in different places for all or most of the time that they teach and learn. Because they are in different places, in order to interact with each other they are dependent on some form of communications technology. To use these technologies successfully teachers must know the different design and messaging techniques that are special to those technologies. To enable teachers to design courses and interact with learners through technology, administrators in educational and training institutions have to organize their resources differently from what works for classroom teaching. From the student's point of view there are differences too. Students have to learn how to study through technology, how to communicate for learning—which is not always the same as what they do socially. This way of learning usually appeals to a broader section of the population than those who go to bricks and mortar schools, and consequentially these students often need different kinds of support, and help with different kinds of problems.

Different technologies, different teaching techniques, and different types of students all mean that different ways must be found to manage and administer the programs provided. Sometimes it has been found necessary to set up entirely new institutions or set up a new department within an existing institution, and in other cases institutions have entered into new interinstitutional partnerships. As institutions, and even states and nations, try to fit distance education into their older, established systems or to set up new systems, they find that their traditional policies about education have to be adapted; they may even find it necessary to develop new policies.

As you can see, when you start to think about all the implications of the geographic separation of teachers from learners, an idea that at first seems very simple in fact becomes quite complicated.

A Definition and Clarification of Some Terminology

To capture the multidimensional nature of this field we will use the following definition:

> Distance education is teaching and planned learning in which teaching normally occurs in a different place from learning, requiring communication through technologies as well as special institutional organization.

If you reflect on this definition, you will find that it encompasses a host of other terms that you have probably encountered in your reading. Because they are often the cause of confusion, let's clear up at least a few of them.

First, some people use the term distance learning. If used to describe what happens on the learner's side of interacting with a teacher at a distance, that is fine, but you need to be aware that frequently "distance learning" is used even when the subject is about teaching as well as learning. Because our subject for study is learning *and* teaching we should use the term *education*, the term that correctly describes a relationship that has *two* sides, teacher and learner.

Another term that is widely used is e-learning, and yet another is *online learning*; again, people saying this nearly always mean teaching as well as learning. The prefix e- stands for *electronic*, and usually refers to education that uses the Internet. Similarly, asynchronous learning usually refers to those forms of distance education in which communication is through asynchronous (not-at-the-same-time) communications using the Internet. Another term sometimes considered synonymous with distance education is distributed learning, characterizing its availability at any place and any time. The focus on the place of learning led many for-profit schools to use the term *home study* to describe their programs.

Learning *in education* is also, by definition, planned; the path to learning is designed by one or more experts in the process. Looking out of a classroom window, you might learn something, but what you learn is not part of an educational process (unless a teacher designed it that way!). Nor is what you learn casually when surfing the Web distance education. In distance education one person—the student—deliberately sets out to learn and is assisted by another—the teacher—who deliberately designs ways of helping that person to learn.

This is a good place to dispose of another common cause of misunderstanding—the distinction between education and training. In this book, training is regarded as a domain within the general universe of education, usually aimed at learning practical skills. Everything said about education applies to training, but if we find it necessary to address training specifically we will say so. Similarly we use the term *teaching* synonymously with instruction, and use *teacher* and *instructor* interchangeably. The term *faculty* refers to teachers in higher education.

Now, let us clarify another very important point that causes difficulty for many people. It concerns the boundary between distance education and the use of technology in the classroom. Nowadays most teachers in schools and colleges expect their students to use the Internet to complete assignments and do research to follow up what is taught in the classroom. Another term sometimes used to describe this is blended learning. However, such teaching in the classroom *complemented* by technology is not the same thing as teaching that is *dependent* on technology. This is why our definition of distance education on page 2 uses the word *normally*. It is perfectly reasonable for a classroom teacher to use technology, but that teacher's *normal* location when teaching is the same as the *normal* place of learning. In distance education, it is equally reasonable for students to occasionally meet together and perhaps even meet with the teacher, but the *normal* place of learning is separate from the teacher's location when he or she is teaching. In distance education, technology is the *sole* or *principal* means of communication, which of course is not the case in a classroom.

As is obvious from what has been said, confusion also results when people define education by the technology used. The first technology used for distance education was correspondence through the mail, and so we find the term correspondence education, but later we had *tele-education* (by television, or according to some usage, telephone). As we have mentioned, recent popular terms include online learning, e-learning, and asynchronous learning. Just be aware that any technology might be used in education, and remember that when it is used as *the sole or primary means of teaching* it is a form of distance education.

In some countries, especially in Europe, popular terms associated with distance education are open education, open learning, and *open and distance learning*, abbreviated to ODL. These terms are especially common in countries that had very elitist traditions in higher education, the idea being that distance education can open access to learning. Historically (as will be shown in Chapter 2), distance education in North America provided access to higher education nearly a century before it did in Europe, and so these terms that emphasis openness have had little appeal. We mention this here because you will need to include "ODL" in search terms if you are looking for resources about distance education on the Web, especially for international examples.

When you come across these terms in articles and other venues, you have, unfortunately, to figure out what the particular author means. You will also need to remember them when doing an online document search, because not all the useful articles and Web sites about distance education have correct labels.

Remember, however, that all of these loosely used terms fall within the domain of *distance education* and are covered by the definition of distance education given previously. Apart from being the term that incorporates the others, distance education as a concept is superior for the following reasons. While incorporating the application of technologies, distance education is a multidimensional concept; it is a pedagogy different from that of the classroom; it has a long history, unlike the other terms mentioned above; its history includes a distinctive philosophy of opening access to learning; and it has distinctive organizational forms. More about all of these aspects of distance education will be presented in subsequent chapters of this book.

If you are interested in learning more about the different definitions used in distance education and for a fuller explanation why only the term *distance education* is the correct one, we strongly recommend the article by Kanuka and Conrad (2003).

Levels of Distance Education Organization

The scope of distance education and the different organizations that provide it is the subject of Chapter 3 of this book. For now we would like to provide a preliminary note to explain that in terms of organizational structure, distance education exists at a number of different levels.

Single-mode Institutions

In some institutions, distance education is the sole activity. All the faculty and staff of the institution are exclusively devoted to distance education; their duties are organized differently from those at a traditional college, university, school system, or training department. This organizational model has not found much favor in the United States in the public sector, although there have always been a lot of small (and a few large), for-profit institutions of this type. The most notable examples of dedicated institutions are overseas, the "open universities" that you will read about later. Just for now, here is one example:

EXAMPLE: ATHABASCA UNIVERSITY

Athabasca University (AU) (http://www.athabascau.ca) is Canada's leading single-mode distance-education university. Over 1,200 faculty and staff members on four campuses are dedicated solely to delivering over 700 courses in more than 90 undergraduate and graduate programs. AU serves over 37,000 students (over 7,300 full-load equivalents), with an annual operating budget of $118 million.

Dual-mode Institutions

A dual-mode institution is one that adds distance education to its previously established campus and class-based teaching. By one estimate, between 2002 and 2007 enrollments in online higher education grew by 146 percent (while the total enrollments grew by only 8 percent), and much of this growth was represented by institutions with existing distance education programs, traditionally delivered through the technology of correspondence courses, taking up online delivery. In such dual-mode institutions, the special design and teaching activities are provided in a special unit set up alongside the departments dedicated to conventional teaching. This unit normally has an administrative staff, instructional designers, and technical specialists whose sole responsibilities are distance education. It rarely has its own faculty; most such units call on the faculty of the parent body to provide subject expertise. The regular on-campus faculty usually does the teaching, often with support from part-time faculty. They are all managed by the distance education unit.

EXAMPLES: U.S. ARMY WAR COLLEGE

In addition to its long-established residential courses, delivered mainly at its campus in Carlisle, Pennsylvania the War College provides a series of distance education courses. Addressed to military personnel, the Web site states:

The Distance Education Program (DEP) at the US Army War College allows you to participate in a two-year, rigorous program of instruction that results in

the award of the same Graduation Certificate and the same fully-accredited Master of Strategic Studies degree awarded to graduates of our resident program. At last, you can receive at any duty station or remote location, the same high-quality instruction delivered here at Carlisle Barracks. The Distance Education Program allows you to work a regular full-time job and still make time for a War College degree. https://dde.carlisle.army.mil/

PENNSYLVANIA STATE UNIVERSITY WORLD CAMPUS

The Pennsylvania State University is a state-related research university, ranked in the top 15 nationally for public universities. The enrollment at its main campus is nearly 44,000 with a total enrollment of over 84,000 across its 24 campuses, placing it among the 10 largest public universities in the United States. Penn State provides distance education programs through a special unit called the World Campus (http://www.worldcampus.psu.edu). About 10,000 students in 62 countries and 50 U.S. states chose from among over 500 courses, covering over 60 graduate and undergraduate degrees.

Individual Teachers

With the universal adoption of Web-based communication technologies, many institutions encourage their faculty to deliver part of their classroom teaching online; increasingly some of these institutions also ask their faculty to deliver one or more of their courses as distance education courses, with no classroom component. Without having a specialist unit as in a dual-mode institution, the design, teaching, and administration of these programs rests with the on-campus teachers and administrators. The difference between this and the dual-mode institution can be pictured if you compare how a dedicated unit would be able to systematically organize an arrangement with the campus library to supply books to the distance learners with what an individual professor or even a department could organize. Similarly, think of obtaining funding to support program development or to acquire equipment and specialist staff to record audio and video programs, or even the skills for good-quality Web production, or—most difficult—getting a number of teachers to work together as a course team. It is, to say the least, very challenging for individual teachers working in the framework of resources, which were set up for—and are good at—providing the on-campus forms of teaching and learning, to do all these and other tasks needed to achieve high-quality distance education as well—or sustain it for very long.

Virtual Universities and Consortia

The term *virtual* is used very loosely and is applied at times to all three types of organization that have been mentioned so far; however it is most suited to describe the *consortium*, an organization of multiple institutions banded together to extend the reach of each. Three different patterns can be recognized. The most common is the organization that just provides a public face in the form of an online portal where members of the consortium list their course offerings.

"Here you can find information about distance learning courses across California. Our site does not offer courses directly. Rather, our Course Catalog provides a way to find online courses available at various California schools. Students who wish to request information about a course or enroll should do so through the appropriate school's website." http://www.cvc.edu/

Less common is the form of consortium in which courses are shared, as well as administration, budgeting, and revenues.

ADEC is a nonprofit distance education consortium composed of approximately 65 state universities and land grant colleges. The consortium was conceived and developed to promote the creation and provision of distance education programs and services, by the land grant community of colleges and universities, "through the most appropriate information technologies available." A small core staff works out of the University of Nebraska-Lincoln, coordinating efforts of the membership who are spread across the nation at various land grant colleges and universities.

For more on virtual universities see: http://www.adec.edu/virtual.html

Courses and Programs

When distance education courses are delivered by a dual-mode institution or an individual classroom teacher online, the course is usually an adaptation of the classroom course delivered in the parent institution. In a conventional American university graduate course that typically requires about 150 hours of study, the distance education course will be of the same duration. In other institutions, especially those that deliver training courses for business or professional development, the course might be much shorter, and in single-mode distance education institutions overseas it could be as long as 450 hours.

Courses have been taught by a wide variety of technologies, and in some countries still are. In other words, a distance education course is *not* necessarily an online course—though it more often than not, nowadays, is. What makes a distance education course is not its technology. What is common to every course is—as we said before—that it has both learners and a teacher, content organized around a set of learning objectives, some designed learning experiences, and some form of evaluation. We must emphasize that a course is more than content; an informative Web site, like an encyclopedia, is not in itself a course.

The word *program* is another term with different meanings. Sometimes program refers to a radio or television presentation, which used to be a key part of distance education courses. Frequently a teaching institution will refer to its

"program" to describe the collection of its courses. Usually the meaning will be clear from the context, but we need to alert you not to take these terms for granted when you meet them in your reading. Instead, as with so many terms in education, you have to stop to ask yourself what a particular author means when using the term.

Distinguishing Technology and Media

It is common to use the terms technology and media as synonyms but this is not right. Technology is the physical vehicle that carries messages, and the messages are represented in a medium. There are four kinds of media:

1. text
2. images (still and moving)
3. sounds
4. artifacts

Text is distributed in books, printed study guides, and electronically through DVDs, but mainly online. Sound is distributed on compact discs (CDs), in audiotapes, by telephone, and also online. Visual images are distributed in books and other forms of paper technologies, on CDs, in videotapes, broadcast, and also online. Thus, every technology supports at least one medium—and some can support more than one. The power and attraction of online technology—and here we include mobile, hand-held devices—is that it has the potential to carry *all* forms of media.

In distance education, the issue of Internet access is not the most important issue regarding technology and media. If relatively advanced technology is not available it is usually possible to deliver the teaching-learning messages by a simpler technology. A far bigger problem is the *quality of the media* produced for distribution via the technology. In the United States in particular we often have a preoccupation with setting up access to technologies at the expense of investing in high-quality media for distribution on those technologies. YouTube, for example, carries millions of pieces of media, but you will agree that very few are high quality in content or production values. One of the most common mistakes regarding technology is to overinvest in a particular technology, and to attempt to load more of the media on that technology than it can optimally carry. This technology-led approach has in the past overextended various technologies in turn—that is, printed text, broadcasting, and teleconferencing. The infamous "talking head" TV lecture was an example of a technology (television) superb at communicating certain kinds of visual images, which was nevertheless misused to communicate a heavy load of dense information that would have been better distributed on a different technology (almost certainly print). Today we see the same phenomenon in the overuse of online communications. At the time of writing this text, no online technology has proven as suited to

interaction among several students in different locations with the same sound quality as a traditional telephone conference (although Web conferencing may sometimes come close).

Although each medium has its distinguishing characteristics, there is also variability in each medium that is determined by the technology that distributes it. Text, for example, comes in different forms and these can be mixed—and mixed with different kinds of images—to deliver messages that have different degrees of abstractness and concreteness. Sounds can be delivered with or without images to effect different degrees of social presence and intimacy. Each medium can be used in a more or less highly structured way; think of the difference between a radio news show and a call-in chat program delivered by the same medium by the same technology. Similarly, each medium has a greater or lesser facility for carrying different styles and types of interaction. Our reason for introducing this fact is that it contributes to a core concept in distance education course design. In a high-quality distance education system, after decisions have been taken about what is to be taught and learned, considerable expertise and time is devoted to analyzing the educational messages to determine the optimum combination of media and technologies that will best deliver that content. *This is a theme we will return to in Chapter 5.*

Why Distance Education?

Introducing distance education into an institution or setting up a new distance education institution means making significant changes in how teaching and other resources are used, and this should require careful consideration by people responsible for policy. In particular policy makers at both institutional and governmental levels have to consider not only how they will introduce distance education, but WHY. Among reasons cited for going ahead with this innovation are:

- increasing *access* to learning and training as a matter of equity
- providing opportunities for *updating* skills of the workforce
- improving the *cost effectiveness* of educational resources
- improving the *quality* of existing educational structures
- enhancing the *capacity* of the educational system
- *balancing inequalities* between age groups
- delivering educational campaigns to specific *target audiences*
- providing emergency training for *key target groups*
- expanding the capacity for education in *new subject* areas
- offering combination of education with *work and family life*
- *adding an international dimension* to the educational experience

Clearly some of these needs overlap, and even this is not an exhaustive list, but it should give some idea of the many reasons why distance education has received greater interest from planners in recent years, and suggests some of the reasons there is likely to be further development.

A Systems View and Model

Throughout this book we will often refer to distance education systems. We believe a systems view is very helpful to an understanding of distance education as a field of study, and that adopting a systems approach is the secret of successful practice.

The Idea of System

Our discussion of what is meant by a system could get very complicated, but in keeping with the approach in this introductory level book, we will keep it simple. Let us take an example of a system: the human body, because each of us human beings is a system. The main characteristic of the human system is that every part of the body has a role to play in making the whole body work effectively. There are some parts that could be cut off and the body would still function to a reduced state, but there are many parts that are so indispensable that without all of them, the others, no matter how healthy in themselves, will cease to operate. And take away or damage even the less important parts and the whole organism will deteriorate. On the other hand, building up one part without any attention to the others is also likely to result in damage to the whole body. The healthy body is one in which *all* the parts are healthy and all the parts play their roles in harmony with each other. That is the concept of a system. In order to understand a system it is necessary to understand each of the parts; to correct a malfunction in a system it is necessary to diagnose which part is not working properly.

Let us go one step further and point out that systems exist at different levels of complexity. Although the human body is itself a very complex system, it is only *part* of bigger systems. For example if we were to decide to study a football team or a symphony orchestra, we would have to look at how the different human systems are integrated and functioning as a collective system. In other words, we could think of the individual body as one subsystem within a larger system.

Because distance education requires using a range of technical and human resources, it is always best delivered in a system, and understanding a distance education program is always best when a systems approach is used. A distance education system consists of all the component processes that operate when teaching and learning at a distance occurs. It includes learning, teaching, communication, design, and management. Just think what is actually meant when we use a term like *learning*; consider how complex is the subsystem composed of ten adult learners, each of whom interacts with each other, with an instructor, and with the content of a course. Consider also how, as these processes occur, they are impacted by, and have an impact on, certain forces in the environment where they operate—the physical, political, economic, and social environments in particular. So even these frameworks within which the educational system operates can be seen as part of a larger supersystem. You can't fully understand, for example, a Brazilian soccer player unless you understand not only his intellectual capacity to read the state of play in the game, or his goal-shooting skills;

we also would have to understand his family aspirations in the context of the place that football occupies in the culture and national self-concept of that nation. Similarly you cannot fully understand the potential of developing distance education in the American university without considering, for example, the traditions of the land grant movement and the culture of faculty independence in the American university. Although we may choose to study any of these subsystems separately, we must try also to understand how each impacts the others. Keep in mind the wider contexts as we focus on any single part of the system, and remember that anything that happens in one part of the system has an effect on other parts of the system.

How a Systems View Helps Us Understand Distance Education

In Figure 1.1 we illustrate (within the limitation of a two-dimensional diagram) some of the main macro-factors (the "big" forces) that impact and interact with each of the more immediate parts of the system that we will be studying in this book.

FIGURE 1.1 A Conceptual Model of Distance Education
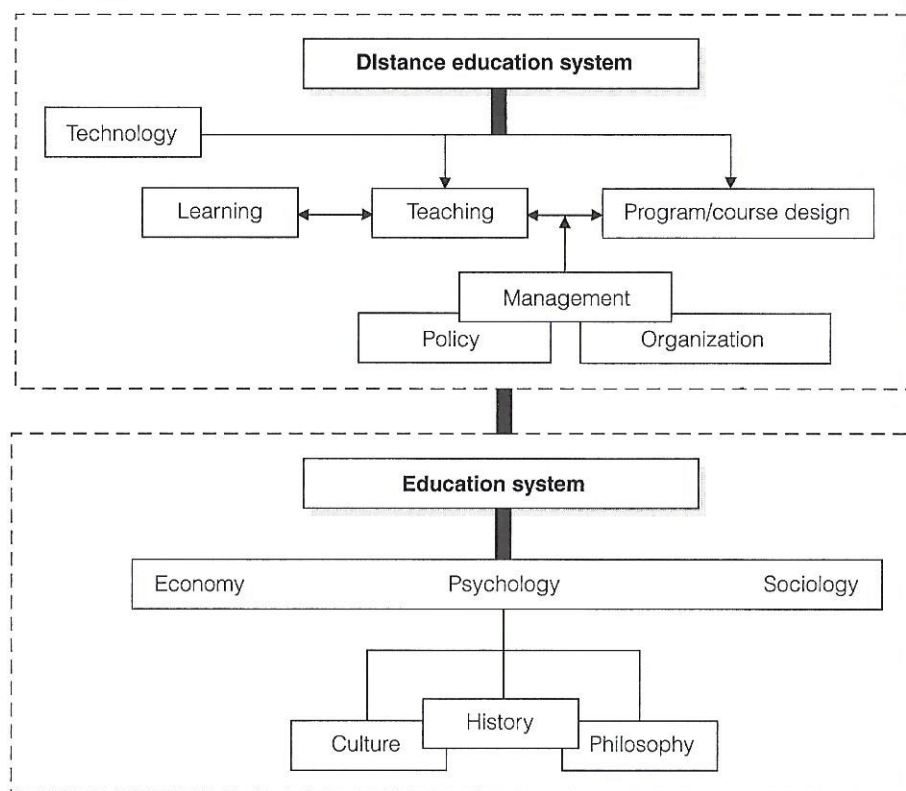
In this figure we are illustrating the main subsystems of a distance education system, resting on the foundation of a larger system; at one level this might be a national education system and at another can be seen as an institution's distance education program built above its parent system. To understand this, imagine what appears to be a relatively straightforward decision that a group of faculty and others will take in the subsystem that we have called the course design system. They are considering what the students can be expected to learn in that time. The very wording of the issue, as we have stated it, carries hints that prior decisions have been taken (or perhaps assumed), illustrated by boxes in the lower part of the figure. They include philosophical positions on the nature of knowledge and the psychology of learning as well as the social role of education. They show decisions already taken about the structure of the course, its content, and its selection against other possibilities—decisions that have been determined by managers and policy makers. These reflect the culture and mission of the organization, its structure, its funding, and the views and experience of its faculty—all of which, among many other organizational variables, come into play as the immediate design question is addressed.

Some of these influences have been determined by institutional policy, which is itself influenced by state and national policies. In the minds of people discussing the issue will be considerations of its implementation by the people who have to teach the course once the design decisions have been undertaken, as well as their understanding of their students. And all of these factors are determined by more fundamental constraints imposed by the overall educational system within which the distance education institution or unit has to operate. (The institution is likely to want accreditation, for example, and therefore the learning objectives will be influenced directly or indirectly by the standards set by its accrediting agency.)

All these are contained within a wider frame, which includes the history of the nation, state, or institution; the culture that has emerged from that history; and the general philosophical assumptions of the society in which the distance education system is set. When, for example, distance education is perceived primarily as a means of overcoming inequalities of educational opportunity (a philosophy), there are consequences in deciding who is enrolled (the learner), what is taught, and how courses are designed; decisions about such matters are likely to be different when distance education is perceived primarily as a means of improving worker productivity. Thus, look inside the box we have labeled "education system" and you will see educational history, educational psychology, educational sociology, economics of education, and so on. So you see how there are systems within systems, within systems ... all of which act on and interact with each other, and which interact on any process that we may select for special study.

Obviously in this introductory book we will not be able to go far into discussing the wider contexts mentioned here. It is sufficient that you are aware of this broad interpretation of the systems view. Our study in this book will be limited to the main *subsystems* within distance education systems. Thus we will devote chapters to teaching, course design, management and policy, and learners. We will give a chapter to the history of distance education and one on distance education in other countries—when it will probably be quite easy to see the

differences in the impact of wider socioeconomic and political forces. Oh yes, there is a chapter on technology! Are you surprised (because we think it is something that distinguishes this book from most others) that we do not begin with a discussion of technology, but that we place technology clearly in its place—albeit an important one—as one component in the context of a total system?

Components of a Working Distance Education System

Let us turn now from thinking about the systems view of distance education as a field of study to see what a distance education system should look like in practice.

In Figure 1.2 (See p. 14) we present a general model that describes the main component processes and elements of a distance education system. Whether in the most sophisticated distance education institution with hundreds of thousands of students, or in a simple one-teacher class, there has to be a system that accommodates all or most of the elements listed in Figure 1.2. There must be:

- a source of content knowledge and teaching (i.e., an educational institution, with faculty and other resources for providing content)
- a course design subsystem to structure this into materials and activities for students
- a subsystem that delivers the courses to learners through media and technology
- instructors and support personnel who interact with learners as they use these materials
- learners in their different environments
- a management subsystem to organize policy, needs assessment, and resource allocation; to evaluate outcomes; and to coordinate other subsystems

We will examine each part of this system briefly, and throughout this book we will focus on each of these components in turn.

Sources of Knowledge

The sources of the content to be taught and the responsibility for deciding what will be taught in an educational program are found in the organization providing the program. This may be a single- or dual-mode institution like a university, college, or school; the training unit of a business corporation, government department, or voluntary agency; or a consortium of collaborating institutions. At any of these organizational levels there must be content specialists who know the field and its literature, theory, contemporary practice, and problems; in the training field there must be people with highly developed skills that they try to transmit to others. Bearing in mind that distance education requires the use of technology and that planning and producing programs for delivery through media, *with quality*, is expensive, choices have to be made by the managers of

Is Teaching Like Flying?

An idea of what a service looks like before the adoption of a systems approach can be found in most industries. We could take the airline industry—or perhaps you prefer to think about health care (or chose your own example and compare with what follows). In the early days of commercial aviation, passengers would be met by the pilot and an assistant on the runway. The crew would collect payment for tickets, accompany the passengers and their luggage to the airplane, and then fly them to their destination. It was not only the airplane (the technology) that was primitive; equally primitive was the *organization* of the process of passenger transportation. Today the airline is organized as a system. This means, first, that there is specialization of labor—work previously done by one person is broken down into many tasks, with each done by a specialist. There is a sophisticated, computer-supported management of the workflow, which ensures everyone's work fits with everyone else's. There is close monitoring of the performance and output of each member of the team, with various feedback loops built in so that a manager can spot a potential breakdown before it interrupts the flow of productivity in the system. A lot of thought goes into planning, especially in determining which markets to work in. No one airline attempts to fly everywhere and some of the most profitable include those with a relatively narrow niche market. Productivity depends on major up-front investments in new technology and training. No single individual, not even the pilot, is able to move the passenger without the contribution of other workers, including technicians, communications specialists, and administrators. The result of this organizational feat is the provision of a service on a vast scale at a per-passenger cost that could not have been imagined at the beginnings of the airline industry. When we compare the airline with a school, university, or training department, we see the direction that a systems approach can offer us.

As with the airline, a distance e only becomes cost-effective *with qual* take advantage of economies of scale. the larger the number of users of the sy the cost for each person. This concep other walks of life, comes about as division of labor and the integration the different specialists. Strangely, edu the few areas of modern life where d or specialization, is still not practice extent. In traditional classrooms, ind develop and deliver their own cours be effective communicators, curricu evaluators, motivators, and group dis tors, as well as content experts. This wasteful use of human resources, wh and objectives of so many courses are to mention the wide variation in qual Simply adding a new technology like this "craft" approach to teaching doe distance education. Instead, courses ne oped by teams of specialists and taken dents across a large number of educatio Just as it is not simply the skill of a p added to new technology that makes so neither the teacher alone nor the t make distance education work, though are both critical components of any sy

The biggest challenge facing edu for legislatures and university senates t that help educational organizations mo approach to a systems approach, for a redistribute the human and capital re charge into a total system, and for trained to work as specialists within su

Source: Based on an editorial by Michael G *American Journal of Distance Education* 7: Reprinted by permission of the author.

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...e will examine each part of this system briefly, and throughout this book ...ll focus on each of these components in turn.

...ces of Knowledge

...ources of the content to be taught and the responsibility for deciding what ... taught in an educational program are found in the organization providing ...gram. This may be a single- or dual-mode institution like a university, ..., or school; the training unit of a business corporation, government ...ment, or voluntary agency; or a consortium of collaborating institutions. ...y of these organizational levels there must be content specialists who ...the field and its literature, theory, contemporary practice, and problems; ...raining field there must be people with highly developed skills that they ...ransmit to others. Bearing in mind that distance education requires the use ...nology and that planning and producing programs for delivery through ...with quality, is expensive, choices have to be made by the managers of
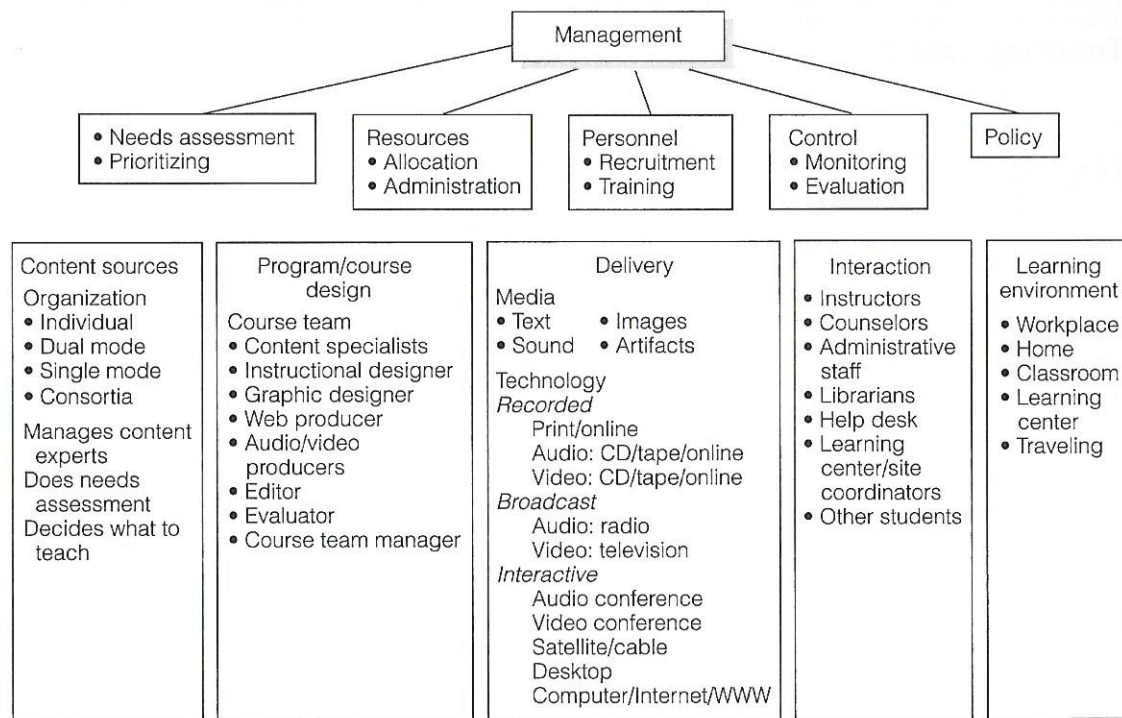
Is Teaching Like Flying?

An idea of what a service looks like before the adoption of a systems approach can be found in most industries. We could take the airline industry—or perhaps you prefer to think about health care (or chose your own example and compare with what follows). In the early days of commercial aviation, passengers would be met by the pilot and an assistant on the runway. The crew would collect payment for tickets, accompany the passengers and their luggage to the airplane, and then fly them to their destination. It was not only the airplane (the technology) that was primitive; equally primitive was the *organization* of the process of passenger transportation. Today the airline is organized as a system. This means, first, that there is specialization of labor—work previously done by one person is broken down into many tasks, with each done by a specialist. There is a sophisticated, computer-supported management of the workflow, which ensures everyone's work fits with everyone else's. There is close monitoring of the performance and output of each member of the team, with various feedback loops built in so that a manager can spot a potential breakdown before it interrupts the flow of productivity in the system. A lot of thought goes into planning, especially in determining which markets to work in. No one airline attempts to fly everywhere and some of the most profitable include those with a relatively narrow niche market. Productivity depends on major up-front investments in new technology and training. No single individual, not even the pilot, is able to move the passenger without the contribution of other workers, including technicians, communications specialists, and administrators. The result of this organizational feat is the provision of a service on a vast scale at a per-passenger cost that could not have been imagined at the beginnings of the airline industry. When we compare the airline with a school, university, or training department, we see the direction that a systems approach can offer us.

As with the airline, a distance education system only becomes cost-effective *with quality* when it can take advantage of economies of scale. This means that the larger the number of users of the system, the lower the cost for each person. This concept, so familiar in other walks of life, comes about as a result of the division of labor and the integration of the work of the different specialists. Strangely, education is one of the few areas of modern life where division of labor, or specialization, is still not practiced to any great extent. In traditional classrooms, individual teachers develop and deliver their own courses. They try to be effective communicators, curriculum designers, evaluators, motivators, and group discussion facilitators, as well as content experts. This is an extremely wasteful use of human resources, when the content and objectives of so many courses are identical—not to mention the wide variation in quality it produces. Simply adding a new technology like the Internet to this "craft" approach to teaching does not give good distance education. Instead, courses need to be developed by teams of specialists and taken by many students across a large number of educational institutions. Just as it is not simply the skill of a pilot even when added to new technology that makes an airline work, so neither the teacher alone nor the technology will make distance education work, though of course these are both critical components of any system.

The biggest challenge facing education today is for legislatures and university senates to adopt policies that help educational organizations move from a craft approach to a systems approach, for administrators to redistribute the human and capital resources in their charge into a total system, and for teachers to be trained to work as specialists within such a system. *Source:* Based on an editorial by Michael G. Moore in the *American Journal of Distance Education* 7:1. 1–10, 1993. Reprinted by permission of the author.

FIGURE 1.2   A Systems Model for Distance Education

Management
- Needs assessment
- Prioritizing

Resources
- Allocation
- Administration

Personnel
- Recruitment
- Training

Control
- Monitoring
- Evaluation

Policy

Content sources

Organization
- Individual
- Dual mode
- Single mode
- Consortia

Manages content experts

Does needs assessment

Decides what to teach

Program/course design

Course team
- Content specialists
- Instructional designer
- Graphic designer
- Web producer
- Audio/video producers
- Editor
- Evaluator
- Course team manager

Delivery

Media
- Text
- Sound
- Images
- Artifacts

Technology
Recorded
  Print/online
  Audio: CD/tape/online
  Video: CD/tape/online
Broadcast
  Audio: radio
  Video: television
Interactive
  Audio conference
  Video conference
  Satellite/cable
  Desktop
  Computer/Internet/WWW

Interaction
- Instructors
- Counselors
- Administrative staff
- Librarians
- Help desk
- Learning center/site coordinators
- Other students

Learning environment
- Workplace
- Home
- Classroom
- Learning center
- Traveling

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carefully selected parts of the whole picture, each one set in a contex[t] duced and explained, with certain features highlighted and with con[...] made (between rainfall and crop production, for example), which the u[...] study of an atlas would not provide. Therefore, preparing a distance e[...] course requires not only the content expert but also instructional design[...] can organize the content according to what is known about the theory a[...] tice of knowledge management and the theory of learning.

Since the courses and the teaching will be delivered by technolo[...] course materials need to be designed by specialists who know how to m[...] best use of each available technology. Although there are some content [...] who also have instructional design skills and others who have knowl[...] technology, very few are equally expert in all three areas. It is better [...] responsibilities are carried by different specialists. The instructional d[...] should work with the content experts to help them decide on such ma[...] (a) the learning objectives of the course and each of its component parts, [...] exercises and activities the learners should undertake to achieve the object[...] the layout of text and graphics, (d) the content of recorded audio or vid[...] ments, and (e) the questions for interactive sessions by online chat session[...] Wikis and blogs, or by audio or video conference. Graphic designers, W[...] ducers, and other media specialists should be brought in to turn the idea[...] content experts and instructional designers into high-quality course mater[...] programs. Decisions must be made about which part of the instruction ca[...] effectively be delivered by each particular medium. To go back to our p[...] example, when might it be better to describe the rainfall pattern in a pa[...] of text, when through a photograph, when through a podcast interview [...] meteorologist, and when in a video-clip? And when indeed might it be b[...] tell the student to go search online and report findings to the instructor? [...] evaluation and research experts must plan how to evaluate individual [...] learning, as well as the effectiveness of all aspects of the distance ed[...] course, in order to ensure that it works—in other words, to meet the n[...] students and the teaching organization and provide cost-effective instruct[...]

Because so many skills are needed to design a distance education cou[...] best courses are designed by teams in which many specialists work togeth[...]

Delivery of Course Material and Interaction via Technologies

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the organization about what particular content will be taught. Ideally there will be a subsystem for scanning the social environment (some people would call it a market), and for making the determination of what to teach on the basis of data about needs and demand. This includes finding out what knowledge students themselves feel they need.

Although the principal source of content knowledge is usually the faculty or staff of the organization, other sources include external consultants. Sometimes a noneducational entity will enter into an agreement with an educational organization to have a program designed specifically to meet its corporate needs. Students are also considered a source of knowledge according to contemporary constructivist philosophy, which leads to the inclusion of project work and other self-directed learning activities in the design of courses.

Design of Courses

Content, or subject matter, does not make a course. In a course, the content is organized into a carefully designed structure that is intended to make it as easy as possible (that is not the same thing as "easy"!) for the student to learn. It is not impossible, for example, to learn the geography of a country by studying an atlas, but an atlas is not a course. A course on the geography of that country consists of
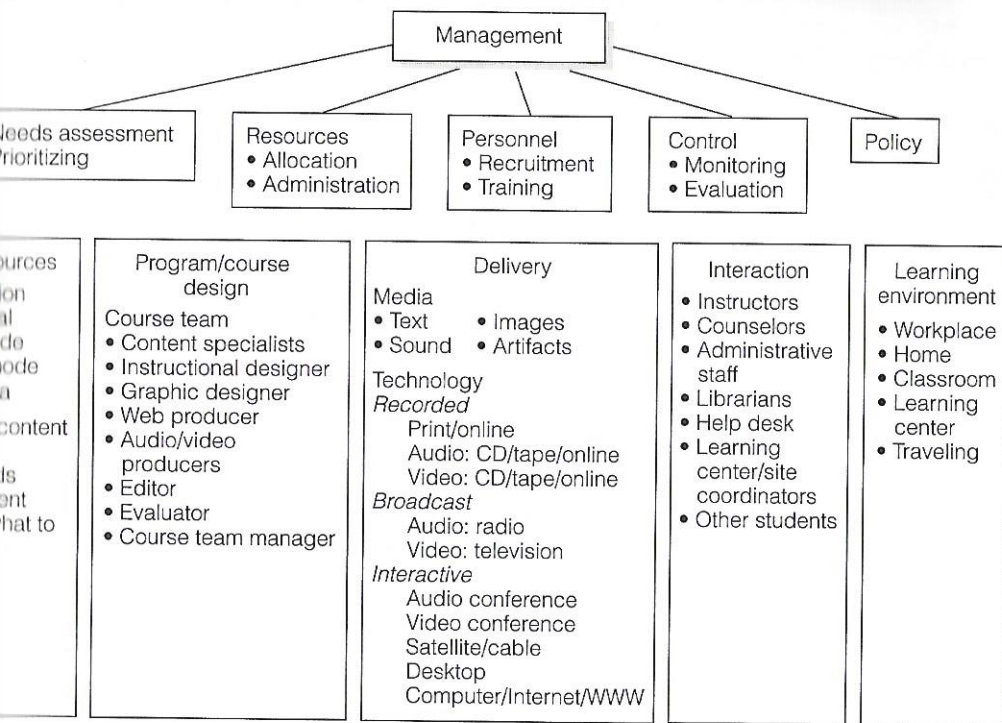
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                          │  Management  │
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│assessment │ │• Allocation│ │• Recruitment│ │• Monitoring│ └───────────┘
│rioritizing│ │• Administration│ │• Training │ │• Evaluation│
└───────────┘ └───────────┘ └───────────┘ └───────────┘
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	Program/course design	Delivery	Interaction	Learning environment

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ls
ent
hat to
	Course team
	• Content specialists
	• Instructional designer
	• Graphic designer
	• Web producer
	• Audio/video producers
	• Editor
	• Evaluator
	• Course team manager
		Media
		• Text • Images
		• Sound • Artifacts
		
		Technology
		Recorded
		  Print/online
		  Audio: CD/tape/online
		  Video: CD/tape/online
		Broadcast
		  Audio: radio
		  Video: television
		Interactive
		  Audio conference
		  Video conference
		  Satellite/cable
		  Desktop
		  Computer/Internet/WWW
			• Instructors
			• Counselors
			• Administrative staff
			• Librarians
			• Help desk
			• Learning center/site coordinators
			• Other students
				• Workplace
				• Home
				• Classroom
				• Learning center
				• Traveling

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carefully selected parts of the whole picture, each one set in a context, introduced and explained, with certain features highlighted and with connections made (between rainfall and crop production, for example), which the unguided study of an atlas would not provide. Therefore, preparing a distance education course requires not only the content expert but also instructional designers who can organize the content according to what is known about the theory and practice of knowledge management and the theory of learning.

Since the courses and the teaching will be delivered by technology, the course materials need to be designed by specialists who know how to make the best use of each available technology. Although there are some content experts who also have instructional design skills and others who have knowledge of technology, very few are equally expert in all three areas. It is better if these responsibilities are carried by different specialists. The instructional designers should work with the content experts to help them decide on such matters as: (a) the learning objectives of the course and each of its component parts, (b) the exercises and activities the learners should undertake to achieve the objectives, (c) the layout of text and graphics, (d) the content of recorded audio or video segments, and (e) the questions for interactive sessions by online chat sessions or in Wikis and blogs, or by audio or video conference. Graphic designers, Web producers, and other media specialists should be brought in to turn the ideas of the content experts and instructional designers into high-quality course materials and programs. Decisions must be made about which part of the instruction can most effectively be delivered by each particular medium. To go back to our previous example, when might it be better to describe the rainfall pattern in a paragraph of text, when through a photograph, when through a podcast interview with a meteorologist, and when in a video-clip? And when indeed might it be better to tell the student to go search online and report findings to the instructor? Finally, evaluation and research experts must plan how to evaluate individual student learning, as well as the effectiveness of all aspects of the distance education course, in order to ensure that it works—in other words, to meet the needs of students and the teaching organization and provide cost-effective instruction.

Because so many skills are needed to design a distance education course, the best courses are designed by teams in which many specialists work together.

Delivery of Course Material and Interaction via Technologies

In all education there has to be communication between a teaching organization and a learner. In distance education this communication takes place through some kind of technology. Nowadays the most common technology is the computer with its browser linked into the Internet, delivering text, audio, and video messages as well as providing a means of interaction of instructors and learners, and of learners and learners. Older technology is still used sometimes, and more so in less-developed countries, including printed media books and/or study guides, compact discs, and, in some countries, radio and television broadcasting as well as telephone and satellite–based

audio and videoconferencing. These technologies can be classified in a number of ways, but one that we find particularly useful is the differentiation between recorded (also referred to as asynchronous) and interactive (synchronous) technologies. Compact discs and Web pages are of the former type, while the audio-conference or Second Life meeting is the latter.

This distinction leads to one of the main basic principles in using technology, which is to recognize that no single technology is optimal for delivery of every kind of message to all learners in all locations. Following that, another principle is that it is always desirable to have at least one recorded technology primarily suited to the delivery of content and another that is suitable for interaction between learner(s) and instructor(s). In courses delivered on the Web, instructional materials are recorded in text, audio, and video, and then interaction is facilitated using the same technology.

Interaction: The Role of Instructors

Besides receiving course materials distributed by technology, distant learners need to communicate with people at the teaching institution, particularly the people appointed as instructors. The materials distributed through technology are produced for a mass audience or at least for a class group; it is the communication that goes on between the *individual* learner and an instructor that transforms common information into personally relevant knowledge. Compared to what may be called the *Presentation* phase of distance teaching, when course materials are designed and then distributed, this *Interactive* phase of distance teaching is equally significant. The nature and extent of the interaction that is deemed necessary varies according to the designers' teaching philosophy, the nature of the subject matter, the maturity of the students, their location, and the technology used in the course. In a well-structured system, the interactions between instructors and students will be based on issues and questions determined by the course designers, who include, of course, the content experts. Until the arrival of the Internet these interactions were often conducted between an instructor and a group of students by means of teleconference technologies. Nowadays, with the Web the technology for communicating, interaction occurs in synchronous chat rooms, asynchronous discussion forums, by e-mail, in Wikis, blogs, virtual reality, Webinars.

A common difference between distance education and conventional education—and one that many people consider necessary for high-quality distance education—is that in a distance education course it is common for the interaction to be conducted by specialist instructors who might have played little or no part in the processes of designing the course. As mentioned earlier, in a systems approach, courses are usually designed by teams that include instructional designers and media and technology specialists as well as content experts. The *fixed* cost of such teams and their products, if the quality is high, is also high, but the *average* cost of the course for each student can be low, provided a fairly large number of students take the course. Teaching such a large number means more people than those in the course design team are needed to conduct the

interaction with learners. This is a good thing, because instruction requires a special set of skills, different from those of designers and subject experts, and is better done when it is the work of persons who devote themselves to the study and practice of those skills. Thus the normal procedure in a good systems approach to distance education is that once the courses have been designed and distributed through technology, students are allocated by the teaching organization to instructors, sometimes referred to as tutors, who interact with them to provide individualized instruction on the basis of the designed materials.

In the systems approach, quality control by continuous assessment of every part of the system is very important. A key component of this is the production at regular intervals of a *product* by each student, usually referred to as the assignment. It is the course design team that sets assignments based on the content of each unit of a course, and each student completes these assignments and sends them to the instructor, usually as an e-mail attachment. Instructors review, comment on, evaluate, and return the assignments, forwarding the evaluation report to the administration of the institution, which uses it as part of its monitoring process.

Most educators feel it is highly desirable that learners interact with each other as well as with the instructor. Through blogs, wikis, chat rooms, and similar technologies, designers can set up cooperative learner groups, and instructors are in a position to facilitate peer support and student knowledge construction.

As well as interacting with instructors, whose main job is to help students learn the content of the course, students may also interact with specialists in various forms of student support. Student support personnel may deal with problems arising from poor study techniques, or help to solve time management problems or even personal problems that interrupt a student's progress. Students will also interact with administrative staff when registering for courses or checking their progress. In some systems the distance education agency organizes special face-to-face meetings—for example, when it is necessary to have a laboratory experience that cannot be simulated or in any other way delivered by technology.

Learners in Their Learning Environments

The student's learning environment is also part of the distance education system, having considerable impact on the effectiveness of those parts of the system controlled by the educational agency. This environment in which people interact with their course materials and interact with their instructors may be their work places or homes, in a classroom or at a learning center, in hotels, or on airplanes. One of the most popular places for listening to audio on discs or MP3 players is when commuting to work in a car and another is working out in a gym! Many stories are told about distant learners in demanding locations—on battlefields, in submarines, in lighthouses, and in prisons. One of our students, a nurse, reported a discussion she had about distance learning theory when scrubbing up in preparation for work in an open heart operation! Learning in the work place or at home is challenging because there are many distractions. To overcome these and other work-, social-, and family-related distractions, students must consciously train themselves in disciplined study habits. They must, for

with enough understanding of distance education, it is possible to identify a relationship between any one input or output variable and all of the others.

Distance Education Is about Change

As you read this book you will recognize, if you don't already, that distance education is both a cause and a result of significant changes in our understanding of the very meaning of education itself—as well as of more obvious changes in understanding how it should be organized. At the most obvious level, distance education means that more people have access, more easily, to more and better learning resources than they could in the past, when they had to accept only what was locally provided, if they could access even that. As the use of distance education spreads, previously disadvantaged populations, such as rural and inner-city students, can take courses from the same institutions and same faculty that were previously only available to students in privileged, mainly suburban areas. Handicapped and disabled students can also have access to the same courses as everyone else—even if they are homebound or institutionalized. Adults who need specialized training for career enhancement or basic skills can take courses without having to be away from home or their current jobs. Students in one country can learn from teachers and fellow students in others. Courses can be accessed whenever the student wants at his or her preferred pace, from almost any location. Overall, distance education opens up many new learning opportunities for many people. Beyond access, distance education gives a greater degree of control to the learner in relation to the teaching institution, which might have significant effects on what the institution offers to teach and the way it teaches. We are in the middle of a Copernican revolution as it becomes ever more apparent that the learner constitutes the center of the universe, and that teaching no longer drives learning; instead, teaching responds to and supports learning. Such freedom and opportunity, however, means that students must accept the consequence of assuming more responsibility for managing their own learning, in such matters as deciding when they will study, how much they want to learn, and seeking out information and resources. Some students will need help in making the necessary adjustments in their expectations of the teaching institution and in their competencies as students.

As more institutions set up distance education systems, the roles of instructors will continue to change. In moving to a distance education system, some instructors will have the job of preparing materials without being involved in interaction with students; or if they do, they will have to use the communications technologies, and so learn to teach quite differently. Good managers will find appropriate positions for those teachers who want to be content specialists, those who prefer to provide interactive support to students, and those who are good at designing and producing mediated communications.

Administrators too will perform different and new duties. Instead of worrying about classroom availability and class scheduling, they will be concerned with ensuring that the various resources are available—often in distant locations—for the design and delivery of courses as well as student support. They have to develop new admissions procedures, and find alternatives to "residency" as criteria of excellence.

Thus the growth of distance education implies major changes of the culture as well as the structure of those schools and training organizations that decide to become involved. There are rewards but also there are costs in making these changes. The cost is in the stress on existing employees making the changes. The reward includes the potential of being able to reach students anywhere in the country or the world and improved quality programs. An unavoidable cost is that every school or training group offering similar instruction will find itself in competition with every other and that means making difficult decisions about what to offer and what not to offer. A key idea in distance education is the principle of comparative advantage. This means that each school, university, or training group should decide what subjects it has an advantage in, compared to competing organizations; it should then specialize in providing instruction in that subject. The future educational system will have no geographic boundary, but each organization will be more focused and specialized in the range of subjects it offers. This will also mean that all educational providers will need to rethink their marketing strategies.

As a result of these changes, the quality of distance education will continue to rise. The higher quality will be recognizable. Distance education courses are open to public scrutiny since they are delivered by mediated programs that can be accessed easily. This leads to a new emphasis on quality and accountability for educational offerings in general.

VIEWPOINT

Chere Campbell Gibson

Technology has brought us access to information to a degree unheard of in the past. As I reflect on the future of teaching and learning with technology and distance education, I see a decrease in the presentation of content and an increase in emphasis on the learning process. Learning through authentic problem solving, inquiry-based learning and context-based problem posing will be accentuated at all levels of education. Learners will be challenged to work on increasingly more complex problems as well as to engage in problem identification itself. Working with others, both within disciplines and across disciplines in interdisciplinary problem-solving teams, will be encouraged to help learners broaden their repertoire of skills t[o] information and create knowledge, it. I truly believe the future will foc[us] the available tools and informatio[n] organizational, and community gr[oups] content becomes less relevant—tool[s] of the processes of learning, both others, working within and acros[s] problem solution, as well as proble[ms] and critical assessment of resource[s] the fore. (I hope!)

Source: Chere Campbell Gibson, Professor of Wisconsin-Madison

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it. I truly believe the future will focus on the use of
the available tools and information for personal,
organizational, and community growth. Teaching
content becomes less relevant—tool mastery, mastery
of the processes of learning, both alone and with
others, working within and across disciplines for
problem solution, as well as problem identification
and critical assessment of resources, will come to
the fore. (I hope!)

Source: Chere Campbell Gibson, Professor Emerita, University
of Wisconsin-Madison

This chapter has introduced some basic ideas about distance education and proposed that a systems model is essential to both the understanding and the practice of distance education. The main points are:

- Distance education organizations should be studied and evaluated as systems. A system includes the subsystems of knowledge sources, design, delivery, interaction, learning, and management. In practice the better these are integrated, the greater will be the effectiveness of the distance education organization.

- When organizations adopt a systems approach to distance education, there will be an impact on teachers, learners, administrators, and policy makers. There will also be significant changes in the way that education is conceptualized, funded, designed, and delivered. Not least will be the opening of access and improvements in quality.

For further discussion about a systems approach to distance education see Shaffer, S. C. (2005) and to education generally, see Banathy (1993).

Questions for Discussion or Further Study

1. Identify more examples of the different types of distance education organization. Can you list some advantages of each of the different types?
2. Look at the list under the heading Why Distance Education? (see p. 8) and suggest examples of organizations motivated in the ways listed.
3. Is teaching like flying? Discuss.
4. Look at Figure 1.3 on page 19. Can you connect each input to every output?
5. Discuss Chere Campbell Gibson's comments on future directions of distance education.

The Historical Context

Although some people think distance education began with the invention of the Internet, this is wrong. You can only understand the methods and issues in distance education today if you know their historical background. This is what we will summarize in this chapter.
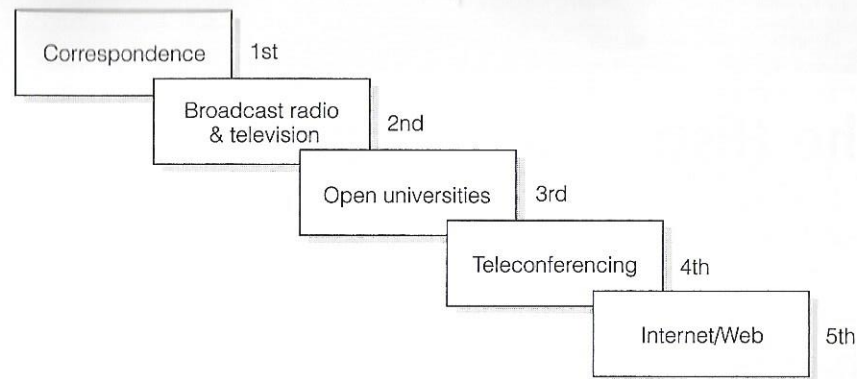
As illustrated in Figure 2.1, distance education has evolved through several historical generations. The first generation was when the medium of communication was text and instruction was by postal correspondence. The second generation was teaching by means of broadcast radio and television. The third generation was not so much characterized by communications technology, but rather the invention of a new way of organizing education, most notably in the "open universities." Next, in the 1980s, we had our first experience of real-time group interaction at a distance, in audio and video teleconference courses delivered by telephone, satellite, cable, and computer networks. Finally, the most recent generation of distance education involves teaching and learning online, in "virtual" classes and universities, based on Internet technologies. Many teaching methods honed over the years when teaching was by text, audio, or video are transferable to the contemporary online platforms, and many issues encountered online have been experienced and dealt with by previous generations.

First Generation: A Brief History of Correspondence Study

The history of distance education begins with courses of instruction that were delivered by mail. Usually called correspondence study, it was also called "home study" by the early for-profit schools, and "independent study" by the universities.

Beginning in the early 1880s, people who wanted to study at home or at work could, for the first time, obtain instruction from a distant teacher. This

FIGURE 2.1   Five Generations of Distance Education

Correspondence — 1st
Broadcast radio & television — 2nd
Open universities — 3rd
Teleconferencing — 4th
Internet/Web — 5th

was because of the invention of a new technology—cheap and reliable postal services, resulting largely from the spread of the railway networks. In 1878 Bishop John H. Vincent, cofounder of the Chautauqua Movement, created the Chautauqua Literary and Scientific Circle. This organization offered a 4-year correspondence course of readings to supplement the summer schools held at Lake Chautauqua in upstate New York (Scott, 1999). Teaching through the mail was first used for higher education courses by the Chautauqua Correspondence College. Founded in 1881, it was renamed the Chautauqua College of Liberal Arts in 1883 and authorized by the State of New York to award diplomas and degrees by correspondence (Bittner & Mallory, 1933). About the same time and not far from Chautauqua, in Scranton, Pennsylvania, a private vocational school called the Colliery Engineer School of Mines was set up by a newspaper editor, Thomas J. Foster, to offer a correspondence course on mine safety. Such was the success of this course that the school soon began to offer other courses; in 1891 it renamed itself the International Correspondence Schools and, after becoming part of the Thomson publishing empire is now known as Penn Foster (see http://www.penn-foster.com/). One reason for ICS' success was their close ties to corporate management. They contracted with many corporations to help them improve their workers' skills by discounting training expenses. Most corporations recognized correspondence schools like ICS by referring their employees to their correspondence courses, by deducting tuition fees through payrolls, and by using enrollment in these correspondence schools as a basis for promotion. The confidence the ICS gave to corporations is as their president promised:

> Our greatest service to industry is in bringing a man through the ranks where he is employed. Our first aim is to assist men with initiative to qualify for advancement and usually this can be accomplished most effectively with the confidence of the employer and by cooperating with him in solving his training problems. Our close relations with employers would not be cordial if we promised other positions to students. The student grows up in the industry as a rule and is not

transplanted to some other industry (The Society for the Promotion of Engineering Education, 1931, p.141).

Between the 1890s and the 1930s, there were over 200 proprietary correspondence schools like ICS that offered correspondence instructions and covered a wide range of topics on vocational subjects, including the Home Correspondence School of Springfield in Massachusetts and the American Farmers' School in Minneapolis.

It should be noted that similar experiments in using the mail to deliver teaching occurred in other countries. In Great Britain, Isaac Pitman used the national postal system in the 1840s to teach his shorthand system. In Europe, in the mid-1850s Charles Toussaint, a Frenchman, and Gustav Langenscheidt, a German, began to exchange language instruction, leading to the establishment of a correspondence language school. Similar initiatives were taken around the world as one country after another developed their postal systems. Courses were usually in vocational subjects or, as we would say today, were "noncredit" courses. In England a group of professors at the elite University of Cambridge went so far as to try to establish an academic degree by correspondence as a way of opening up access to higher education for working people. The idea was firmly rejected by the administration, with the beneficial effect—for the United States—that one of its leading advocates, professor Richard Moulton, emigrated there. He became acquainted with another visionary, William Rainey Harper, and jumped on the opportunity to work with Harper in setting up exactly the kind of university courses that Cambridge had rejected.

William Rainey Harper had acquired an interest in teaching by correspondence as a professor at the Baptist Union Theological Seminary in Morgan Park, Illinois, where he used the method to teach courses in Hebrew. In his summers he was a volunteer at the Chautauqua Institutes and it was he who introduced the method of correspondence there, extending the Institute's educational programs across the country and throughout the year. In 1892 Harper was appointed to be the first president of the new University of Chicago. Inspired by his experiences at Chautauqua and by Richard Moulton's egalitarian vision of using the technology of the mail system to open opportunities for learning to the adult population, he began his tenure as president by setting up a correspondence study program, thus initiating the world's first formal program of university distance education.

The principal motive for the early correspondence educators was the vision of using technology to reach out to those who were otherwise unprovided for. At the time, this included women, and perhaps for this reason, women played an important part in the history of distance education. A notable leader was Anna Eliot Ticknor, who as early as 1873 established one of the first home study schools, the Society to Encourage Studies at Home. The purpose of this "school" was to offer women, who were usually denied access to formal educational institutions, the opportunity to study through materials delivered to their homes (Nasseh, 1997).

Other examples of the use of correspondence for the education of women are found in the histories of the land grant universities. For example, in 1900,

Cornell University appointed Martha Van Rensselaer to its faculty to develop a program for women in rural upstate New York; within three years there were three credit courses offered by correspondence. In five years, the program enrolled more than 20,000 women (Cornell University, 2001).

Correspondence instruction at the land grant universities was developed on the policy foundation of the 1862 Morril Act. The Morril Act's democratic ideals directed that educational opportunity would be open for people from all backgrounds. The universities were also meant to play a greater part in the daily life of their communities than any university ever had before. Moving away from Old World values, they introduced instruction in the practical arts of agriculture, engineering, business, and home economics. These new ideas were encapsulated by the "Wisconsin idea," which claimed that the boundaries of the university campus would be the boundaries of the state (Altbach, 2001). In fulfilling this mission, correspondence instruction was a powerful tool, which explains why it was the American land grant universities that led the world in developing distance teaching. According to one of the first histories of correspondence teaching (Bittner & Mallory, 1933), by the year 1930, 39 American universities offered correspondence teaching; quoting Dorothy Canfield Fisher, they report that there were "about two million students enrolled every year in correspondence schools … four times the number of all the students enrolled in all the colleges, universities and professional schools in the United States" (Bittner & Mallory, p. 31).

There was rapid growth in the for-profit sector also, although here the sales practices of some of the private schools brought the method into some disrepute. As a consequence, the for-profit schools organized the National Home Study Council (NHSC) in 1926 to regulate schools and promote ethical practices and professionalism (see Hampel, 2009, for the full story of the founding of NHSC). In 1994 the NHSC changed its name to the Distance Education and Training Council (DETC). Two years before the formation of NHSC, the university correspondence educators also formally codified their standards of practice under the umbrella of the National University Extension Association (NUEA).

Society to Encourage Studies at Home

"Miss Ticknor bethought herself of those whose homes were far away from the centers of learning and universities, and yet who craved educational advantages for themselves and their families…. It may be truly said that from her desk in Boston, Miss Ticknor laid out and directed courses of study over the country. By a well organized system of distribution, she sent books, engravings, photographs, maps, all that makes the outfit of thorough instruction, to the doors of families living far from libraries, museums or colleges."

Source: Elizabeth Carey Agassiz. Society to Encourage Studies at Home (Cambridge, MA: Riverside Press, 1897). Quoted in MacKenzie, O., Christensen, E. L., & Rigby, P. H. (1968).

In 1968 one of the most thorough studies of correspondence education was sponsored by both the NHSC and the NUEA. Called the Correspondence Education Research Project (CERP), it reported that approximately 3 million Americans were studying through this method nationwide (MacKenzie et al., 1968). Of those, nearly 10 percent were in college programs, more than 20 percent in private schools, and about 9 percent in other categories; more than 50 percent were studying in the armed services.

In 1969, in an attempt to distinguish themselves from the home study schools, university correspondence educators decided to call their method "independent study." Previously known as the Correspondence Study Division, it became the Independent Study Division of the National University Extension Association, later the National University Continuing Education Association, and now the University Professional and Continuing Education Association. The Independent Study Division was abolished along with other UCEA divisions in 1998. In 1992 a new organization, the American Association for Collegiate Independent Study (AACIS), was formed to advance the interests of independent study professionals.

The Origins of Distance Education in the High School: The Benton Harbor Plan

In the fall of 1922 in Benton Harbor, Michigan, Mr. S. C. Mitchell was appointed principal of Benton Harbor High School. Situated in a working class community, it had about a thousand students. Mitchell felt that the curriculum was too heavily biased towards college preparatory subjects and decided that there should be more vocational subjects. This was not a popular notion in the educational culture of those days and there was no hope of obtaining faculty to teach such subjects. Therefore, Mitchell approached one of the nation's most respected for-profit distance education schools, the American School in Chicago. He enrolled a group of nine students in their correspondence courses and undertook to supervise the students in his classroom. Success led to expansion, so that by 1937 Mitchell had 304 pupils enrolled in 38 different courses.

The practice became known as "supervised correspondence study" and spread around the country, so that by 1930 similar projects had been attempted in more than 100 public high schools. In 1938 it was the subject of a report presented by J. S. Noffsinger to the First International Conference on Correspondence Education (Noffsinger, 1938). According to Noffsinger, "it was soon demonstrated that supervised correspondence study was not only a valuable method for enriching the curriculum with vocational subjects, as Mitchell had proven at Benton Harbor, but that it was also most valuable in offering a solution to at least three other problems in the secondary field, namely: (1) the isolated student, (2) the enriching of the curriculum in the small one-, two-, and three-teacher high schools, which numerically constitute one-half of all public high schools in the United States, and (3) vocational guidance" (Noffsinger, 1938 p. 85).

A significant contribution to the spread of the idea of supervised correspondence study occurred in 1928 when the University of Nebraska adopted it as the basis of an experimental high school under the direction of K. O. Broady. Like Noffsinger, Broady was a giant pioneer of distance education. Two years later Broady received a $5,000 grant from the Carnegie Foundation for the development of this activity. In the following year, 1933, the U.S. Department of Education issued a special bulletin on the subject called "High School Instruction by Mail," and the next year the first conference on Supervised Correspondence Study was held in Cleveland, Ohio.

Modern supervised correspondence study at high school and elementary levels has turned to the application of Internet communications. In this the University of Nebraska remains the leader, a testimony to the foundations laid by Broady and his colleagues, as well as to the pedagogical soundness of the Benton Harbor concept.

According to S. C. Mitchell: "What we sought at Benton Harbor was to find a method of training that could be given under the supervision of our regular teaching staff without breaking the social contacts of the school group, that would be flexible enough to meet every need, not too expensive for our resources, and of a grade we could accept toward graduation" (Noffsinger p.84).

Written nearly three-quarters of a century ago, that still sounds like a good model for a high school distance education program or indeed many other distance education programs. Don't you agree?

Source: Based on Moore (2002).

especially in providing professional continuing education. References to Web sites for these and similar organizations will be found in the Appendix.

Correspondence Education in the Armed Forces

Founded in 1941, the United States Army Institute was transformed in 1943 into the United States Armed Forces Institute (USAFI), headed by William Young (who was director of correspondence education at the Pennsylvania State University) and located in Madison, Wisconsin. By 1966 USAFI offered over 200 correspondence courses in elementary, high school, college, technical, and vocational subjects, catering to some half million students (Brothers, 1971). More than 7 million members of the armed services took high school courses and approximately 261,222 enrolled in college courses before USAFI closed in 1974 (Watkins, 1991, p. 30). USAFI pioneered computerized marking of assignments, a 24-hour phone-in counseling service, and the use of tutorial groups linked to the correspondence curriculum. These and other ideas were taken up by the director of correspondence instruction at the University of Wisconsin, an ex-naval officer, Charles Wedemeyer. During his wartime service he had taken a strong interest in correspondence as a means of training naval personnel, and this interest continued as a result of his association with USAFI on behalf of the university. We will meet Wedemeyer again.

In 1974 the U.S. Department of Defense replaced USAFI with a program called the Defense Activity for Non-Traditional Education Support (DANTES), a program of correspondence education that in effect outsourced the delivery of correspondence courses to the universities and private schools. In organizing this, DANTES cooperated with the Independent Study Division (ISD) of the National University Continuing Education Association (NUCEA) in promoting and delivering independent study programs and courses (Wright, 1991, p. 54).

Second Generation: The History of Broadcasting

Radio

When radio appeared as a new technology in the early part of the twentieth century, many educators in university extension departments reacted with optimism and enthusiasm.

The first educational radio license was issued by the federal government to the Latter Day Saints' University of Salt Lake City, in 1921 (Saettler, 1990). In February 1925, the State University of Iowa offered its first for-credit radio courses over its station WOI. Of the 80 students who enrolled that first semester, 64 would go on to finish their coursework at the university (Pittman, 1986). Other pioneer university radio stations included station WHA at the University of Wisconsin, WLB at the University of Minnesota, KOAC at Oregon Agricultural College, and WRM at the University of Illinois.

During this period, several "schools of the air" were also established to broadcast K-12 educational programs to public school audiences. Examples included the Ohio School of the Air founded in 1929, the RCA Educational Hour established in 1928 with sponsorship from the National Broadcasting Company (NBC), and the American School of the Air in 1930 sponsored by CBS. Radio as a delivery technology for education, however, did not live up to expectations. The lukewarm interest shown by the university faculty and administrators, and the amateurism of those few professors who were interested, proved a poor match for the fierce commitment to the broadcast medium exhibited by commercial broadcasters who wanted it as a medium for advertising. In other countries, where radio broadcasting was a public service and not subject to

Unfulfilled Dreams

" … it is no imaginary dream to picture the school of tomorrow as an entirely different institution from that of today, because of the use of radio in teaching."

Source: Statement to the Federal Radio Commission from the State University of Iowa, 1927 cited by Pittman (1986).

commercial pressures, it was much more successful and in some places, especially in Latin America, still plays a significant role in educational provision.

Television

Educational television was in development as early as 1934. In that year, the State University of Iowa presented television broadcasts in such subjects as oral hygiene and astronomy; by 1939 the university's station had broadcast almost 400 educational programs (Unwin & McAleese, 1988). In that same year, a high school in Los Angeles experimented with television in the classroom (Levenson, 1945). After World War II, when television frequencies were allocated, 242 of the 2,053 channels were given to noncommercial use. In addition to programs broadcast on these channels, some of the best educational television was pioneered by commercial stations. NBC aired Johns Hopkins University's *Continental Classroom,* which some higher education institutions used for credit instruction, and CBS broadcast their *Sunrise Semester.* Although commercial broadcasters gave up on these public service offerings, educational television fared better than educational radio because of the contributions of the Ford Foundation. From 1950 onwards, Ford gave many hundreds of millions of dollars in grants for educational broadcasting. In 1962 the federal Educational Television Facilities Act funded the construction of educational television stations. In 1965 the Carnegie Commission on Educational Television issued a report that led to Congress passing the Public Broadcasting Act of 1967, setting up the Corporation for Public Broadcasting (CPB).

In 1956 the public schools of Washington County, Maryland, were linked in a closed circuit television service, and about the same time the Chicago TV College pioneered the involvement of community colleges in teaching by television. In 1961 the Midwest Program on Airborne Television Instruction involved six states in designing and producing programs broadcast from transmitters transported on DC-6 airplanes. According to Unwin and McAleese (1988), this project, which lasted six years, helped break down state barriers to the exchange of educational programming, as well as set the way for future educational broadcasting by satellite. By the end of the 1970s, there were about 150 educational TV stations broadcasting instructional TV programs ranging from K-12 through postsecondary education throughout the country (Corporation for Public Broadcasting, 1981, p. 37).

Instructional Television Fixed Services

Instructional Television Fixed Service (ITFS) came on the scene in 1961 when the FCC issued an experimental license to the Plainedge School System on Long Island, New York (Curtis & Biedenbach, 1979). ITFS was a low-cost, low-power, over-the-air distribution system that delivered up to four channels of television pictures in any geographic area but only to a radius of about 25 miles. Schools and other educational institutions could receive transmissions using special antennas costing about $500. Public school districts used ITFS for sharing specialist teachers and providing teacher continuing education courses. A pioneering effort in this was the Stanford Instructional Television Network (SITN), which in 1969 began broadcasting 120 engineering courses to 900 engineers at 16 member companies (DiPaolo, 1992). Beginning in 1984, California State University-Chico used ITFS to deliver computer science courses to Hewlett-Packard employees to all their locations in five states.

Cable Television and Telecourses

The first cable television (CATV) began operation in 1952. In 1972 the Federal Communications Commission (FCC) required all cable operators to provide an educational channel. Educational programs delivered by broadcast or cable television were referred to as "telecourses." Among the early leaders in this provision were the Appalachian Community Service Network based at the University of Kentucky, the Pennsylvania State University's Pennarama Network, the privately funded Mind Extension University, the Electronic University Network, and the International University Consortium (Wright, 1991, pp. 55–63). By the mid-1980s, there were around 200 college-level telecourses produced by universities, community colleges, private producers, and public and commercial broadcasting stations, distributed either by the producers themselves or by the Corporation for Public Broadcasting (CPB).

More than 1,000 institutions of postsecondary education signed on each year for courses distributed by the Adult Learning Service of the CPB, enrolling more than 600,000 adult students. Starting in 1981, the Annenberg Foundation supported the CPB on a project that provided funds typically in the 2-3 million-dollar range for university-level telecourses. The courses integrated television programs with textbooks, study guides, and faculty and administrator guides. They were marketed to colleges and universities throughout the country and used by colleges and universities as part of their regular course offerings and by university correspondence programs. The Southern California Consortium, for example, consisted of community colleges, led by Coastline Community College. It successfully bid for and was awarded $5 million to produce one of the outstanding telecourses, *The Mechanical Universe.*

Third Generation: A Systems Approach; AIM and the OU

The late 1960s and early 1970s was a time of critical change in distance education, resulting from several experiments with new ways of organizing technology and human resources, leading to new instructional techniques and new educational theorizing. The two most important experiments were the University of Wisconsin's AIM Project and Great Britain's Open University.

AIM and the Invention of the Systems Approach

The purpose of the Articulated Instructional Media Project (AIM)—funded by the Carnegie Corporation from 1964 to 1968, and directed by Charles Wedemeyer at the University of Wisconsin in Madison—was to test the idea of joining (i.e., "articulating") various communication technologies, with the aim of delivering high-quality and low-cost teaching to off-campus students. The technologies included printed study guides and correspondence tutoring, programs broadcast by radio and television, recorded audiotapes, telephone conferences, kits for home experiments, and local library resources. Also "articulated" into the program was student support and counseling, discussions in local study groups, and use of university laboratories during vacation periods.

Wedemeyer's idea regarding students was that using a variety of media meant that not only could content be better presented than through any one medium alone, but also that people with differing learning styles could choose the particular combination that was most suited to their needs. To bring together the expertise needed to produce such integrated multimedia programs, AIM invented the idea of the course design team, formed of instructional designers, technology specialists, and content experts (Wedemeyer & Najem, 1969).

AIM represented a historic milestone and turning point in the history of distance education. This was the first test of the idea of distance education *as a total system*. AIM tested the viability of the theory that the functions of the teacher could be divided, and teaching could be improved when those functions were assembled by a team of specialists and delivered through various media. It tested the idea that a learner could benefit from both the presentation strengths of the broadcast media, as well as the interaction that correspondence and telephone made possible. It expected learners to be self-directed as they worked with the mediated instructional materials, but human helpers would be provided to facilitate interaction and to give help when needed (Wedemeyer & Najem, 1969).

In 1965 Wedemeyer gave a lecture about AIM in Wiesbaden, Germany, after which he was approached by administrators from England's University of Oxford who told him about an idea then circulating in Britain for a "University of the Air" that would teach primarily by television. Wedemeyer was invited to Britain to explain AIM at several universities and to government officials. His accounts included an emphasis on what he considered the failures in the AIM experiment. "AIM," wrote Wedemeyer, "was an experimental prototype with three fatal flaws: it had no control over its faculty, and hence its curriculum; it lacked control over its funds: and it had no control over academic rewards (credits, degrees) for its students. The implications were clear: a large-scale, non-experimental institution of the AIM type would have to start with complete autonomy and control" (Wedemeyer, 1982, p. 23). It is this statement—reflecting the experience that Wedemeyer shared with his British friends and with British politicians—that as much as any other provides the reference for the genesis of the single-mode distance teaching institutions, particularly the open universities (Moore, 2004).

Birth of the Open University

In 1967 the British government set up a committee to plan a revolutionary new educational institution. At first the idea was simply to use television and radio to open access to higher education for the adult population. In November 1967, officials from the planning committee visited Wisconsin to study the methods and achievements of the AIM project. Soon after, Wedemeyer was invited to meet with them in London. Two years later, as the "Open University" (OU[1]) began to take shape, he moved to the site of its new headquarters to spend several months in the home of Walter Perry, the first vice-chancellor (the head of the university) assisting in developing the new institution. What emerged was the world's premier national distance education university. It would enjoy economies of scale by having more students than any other university, having a strong level of funding, and employing the fullest range of communications technologies to teach a full university curriculum to any adult who wanted such education. As Wedemeyer was able to claim later, "Almost the entire educational geography of an open educational system was identified in the AIM experiment" (Wedemeyer, 1982, p. 24). In particular, with AIM's three fatal flaws in mind, British policy makers stood firm against the objections and pressure from the higher education establishment that they should receive funding to undertake distance education by setting up units inside conventional universities. Instead, policy makers made the courageous decision to establish a fully autonomous institution, empowered to give its own degrees, with control of its own funds and its own faculty. The UK Open University has justified the decision, emerging as a world-class university by any criterion, as well as a model of a total systems approach to distance education. For more on the Open University today, see Chapter 11.

Global Spread of the Systems Approach

In part due to those achievements, the UKOU has been widely emulated in other countries. Because of the large scale needed to obtain both quality and cost effectiveness, many of these open universities are large, or, as described by a previous vice-chancellor of the UKOU, they are "mega-universities" (Daniel, 1996). See Table 2.1 for a list of mega-universities.

In addition to the mega-universities listed in Table 2.1, there are many other open universities, including the Al Quds Open University in Jordan, the Andra Pradesh Open University in India, Athabasca University in Canada, the Open Universiteit Heerlen in the Netherlands, the FernUniversität in Germany, the National Open University in Taiwan, the Open Polytechnic of New Zealand, the Open

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1 The Open University is known in the United Kingdom as "the OU." However, since there are open universities in other countries we will often refer to the first open university as UKOU (i.e., United Kingdom Open University). The term BOU (i.e., British Open University) is sometimes seen but is technically incorrect, since the OU's mandate extends to all the United Kingdom (i.e., Great Britain and Northern Ireland).

Institution	Established	Enrollment
Allama Iqbal Open University	1974	3.2 million
Open University of China	1979	2.7 million
Open University	1992	600,000
Indira Gandhi National Open University	1985	3 million
Universitas Terbuka	1984	646,467
Payame Noor University	1987	183,000
Korean National Open University	1982	210,978
Universidad Nacional de Educación a Distancia	1972	180,000
Sukhothai Thammathirat OU	1978	181,372
Anadolu University	1982	884,081
The Open University	1969	203,744

(2010)

University of Israel, the Universidad Estatal a Distancia in Costa Rica, the Universidad Nacional Abierta in Venezuela, the Universidade Aberta in Portugal, and the University of the Air in Japan.

Although there are differences, these institutions share important similarities: they are single-mode distance teaching institutions, dedicated solely to this approach to teaching and learning, employing teams of specialists to design courses, and enjoying economies of scale through large enrollments.

The American Response

Among the few countries that did not set up a national open university, the most notable is the United States, the nation that gave birth to almost all the main methods on which the success of the OUs depend. Numerous explanations for this have been given. One is that there did not exist in the United States the same political motive—that is, the removal of barriers to higher education—that brought the British policy makers to invest in a very big way in distance education, or the acute need for mass higher education as evidenced by the millions of enrollments in the open universities of India, Pakistan, and China. The United States already had an open educational system, and the state universities had plenty of distance education. Furthermore, where open universities were successfully established, the scale of provision was nearly always national. This required national political commitment and leadership, particularly in facing up to the higher education lobbies. The distributed political control of higher education in the United States, with each state having to deal with its own higher education establishments, made it impossible to obtain a national policy or set up a national delivery system. In the United States, however, another type of

organizational structure, the *consortium*, achieved some of the results that elsewhere were accomplished by the open universities. The earliest of these, predating the open universities, was the United States Armed Forces Institute (USAFI), located in Madison, Wisconsin. USAFI relied on civilian educational institutions to provide its distance education courses, and as early as 1943 had offered about 500 college and high school level courses to American troops around the world (Benbow, 1943). Charles Wedemeyer was heavily involved in USAFI and first developed his ideas that eventually led to the concept of the open universities in that experience.

One of the first consortium forms of organized distance education was the University of Mid-America (UMA). UMA was established by nine Midwestern universities, based at the University of Nebraska with Dr. D. McNeil, a friend of Wedemeyer's and enthusiastic follower of the UKOU developments as first president. The idea was that some of the advantages of the UKOU could be achieved as each of the universities produced courses that would be available to students throughout the consortium (McNeil, 1980). UMA was discontinued in 1982, due to low enrollments, high video production costs, and loss of funding support; this in turn was a reflection of insufficient political support in the member states. However, other, more successful early consortia include the National Technological University (NTU) established in Colorado in 1984 with over 50 member educational institutions and the National University Telecommunications Network (NUTN) with about 60 educational institutions since 1982. (See below.)

The OU's emphasis on learner support in its regional tutorial and counseling services also led to an increased attention to this in the United States, and to an increased sophistication in student service units (Wright, 1991, pp. 55–63) as well as improvement in the quality of course study guides.

Although this discussion has focused on higher education, it should be noted that neither today nor in the past has the majority of American distance learners been in higher education. By 1984 there were approximately 400 "single-mode," private home study schools. They offered courses in about 600 areas of study, primarily continuing education courses aimed at the professions and vocations. Although colleges and universities listed in the National University Continuing Education Association accounted for 300,000 students, schools associated with the National Home Study Council (NHSC) enrolled 4 million students, with the armed services accounting for 700,000. Electronics, business, and computing had become the most popular fields of study (Zigerell, 1984, p. 3).

Fourth Generation: Teleconferencing

Distance education that emerged in the United States in the 1980s was based on the technologies of teleconferencing, and therefore was normally designed for group use. This appealed to a wider number of educators and policy makers; it was a closer fit to the traditional view of education as something that occurs in

"classes," unlike the correspondence or the open university models, which were directed at individuals learning alone, usually in "home study."

The first technology to be used in teleconferencing on a fairly wide scale during the 1970s and into the 1980s was *audio-conferencing*. Unlike previous forms of distance education, which were primarily one-to-one exchanges between a learner and the teacher by correspondence, or were receive-only transmissions of broadcast lessons by radio or television, audio-conferencing allowed a student to answer back, and instructors to interact with students, in real time and in different locations. An audio teleconference could be conducted with individual students at their homes or offices using regular handsets, but normally it meant using special equipment consisting of a speaker and microphones, and one or more different groups of learners. Almost any number of sites could be joined together, either by an operator or by means of a bridge—a device that automatically links a large number of callers simultaneously. The first major educational audio-conference system was at the University of Wisconsin and was a direct outcome of the Articulated Instructional Media project. Known as the Educational Telephone Network (ETN), it was set up in 1965 by Dr. Lorne Parker, one of Wedemeyer's students, with the immediate purpose of providing continuing education for physicians. Starting with 18 locations and a single weekly program, the system expanded to 200 locations in university campuses, county courthouses, libraries, hospitals, and schools with over 35,000 users and more than 100 programs every week. Approximately 95 percent of the network time was used for continuing or noncredit education, with considerable emphasis on the professionals, mainly doctors, lawyers, pharmacists, nurses, engineers, ministers of religion, librarians, and social workers. Other educational institutions developed similar educational telephone networks in other states including Alabama, Arizona, Utah, Missouri, Nebraska, New Jersey, South Carolina, Texas, West Virginia, and New York.

Satellites and Interactive Video-Conferencing

The age of satellite communications began on April 6, 1965, with the launching of the Early Bird satellite. It delivered 240 telephone circuits or one channel of television over the North Atlantic and was considered a technological miracle. By the end of 1967, four International Telecommunications Satellite Organization (INTELSAT) satellites were in orbit and the first educational use of satellite technology came with the launching of the ATS-6, the world's first education satellite, in 1974. The U.S. Office of Education allocated funds for an Educational Satellite Communication Demonstration project, to experiment with extending education and health services through satellite to rural areas including Alaska, Appalachia, and the Rocky Mountain region (Cowlan & Foote, 1975). One of the first universities involved was the University of Alaska, which offered continuing education courses for teachers. Another was the University of Hawaii's Pan-Pacific Education and Communications Experiments by Satellite (PEACESAT), to provide satellite programs over some 20 Pacific Islands. These early satellite services operated at low power and the equipment required to transmit and receive signals was expensive. Programs were usually transmitted to receiving stations and then distributed locally by ITFS or cable networks. Newer technology for Direct Broadcast Satellite (DBS) that developed in the 1990s allowed individuals to receive programs directly in their homes or for individual schools to receive directly at the school.

Although it was the UK Open University that led to an explosion of interest in distance teaching in the rest of the world, what caused a similar interest in the United States was the availability of satellite technology. As we have seen, the American organizational device for using this new technology—whether for broadcasting educational television, or for interactive teleconferencing—was the consortium, a voluntary association of independent institutions that shared the costs, the work, and the results of designing, delivering, and teaching educational courses.

One of the first such consortia, the National University Teleconferencing Network (NUTN), was conceived at a NUCEA meeting in Washington, DC, in February 1982. J. O. Grantham, Director of University Extension at Oklahoma State University, took the lead in convening a planning conference the following month in Kansas City, Kansas. Of the 70 member institutions of NUCEA, 40 participated, agreeing to work together to plan and deliver educational programs by satellite. The Network was established with 66 universities and the Smithsonian Institution as members, and with its base at Oklahoma State University. Over the next 10 years, the network grew to more than 250 organizations either providing or receiving a range of over 100 programs in such areas as: aging, agriculture, AIDS, child abuse, tax planning, reading instruction, engineering, interpersonal relationships, international affairs, marketing, medicine, and social and political affairs. NUTN provided programs to as many as 6,000 people at a time, located at some 200 receive sites. It moved its headquarters to Old Dominion University in 1994 and is currently based at the Dallas County Community College.

The National Technological University was founded in 1984 with support from Hewlett-Packard, IBM, Lockheed Martin, and Motorola as a way to keep their engineers on the cutting edge of technology. Based in Fort Collins, Colorado, it was an accredited university offering graduate and continuing education courses in engineering, and awarding its own degrees. Courses were provided from a pool of some 50 participating institutions. Courses were uplinked to NTU by satellite from the originating university and then redistributed by satellite by NTU to downlinks in some 500 locations, including universities, private sector companies, and government agencies. In 2005 NTU merged with Walden University to become the NTU School of Engineering and Applied Science.

Both NUTN and NTU illustrate some of the key elements of teleconference consortia and a new form of market-driven distance education that emerged in the 1980s. Because they represent a pool of large universities, they could offer a broader selection of courses to prospective clients (either individuals or organizations) than any single member. Secondly, members of the consortium could compete against each other to offer the best quality and most timely

courses—introducing a competitive element at all levels (including individual professors and the courses they teach) that had been largely absent from the U.S. educational system. As a result, the needs of the customers (students, employees, and companies) began to dictate which courses were marketable, and thus worth teaching, not the often esoteric interest of academics.

Other consortia created in the 1980s to provide interactive video-conferencing programs in specific content areas or for certain audiences included:

- AG★SAT (Agricultural Satellite Network) is a consortium established to provide courses originally on agricultural topics. With 32 institutional members, it evolved into the American Distance Education Consortium (http://www.adec.edu).
- The SCOLA (Satellite Communications for Learning) consortium distributed foreign language news broadcasts from 35 countries to be used as the basis of educational programs by its member schools and cable systems (http://www.scola.org).
- The Community College Satellite Network (CCSN) was set up in 1989 by the American Association of Community and Junior Colleges.
- The Black College Satellite Network (BCSN), broadcasting primarily from Howard University, with programs aimed at 105 colleges located in 23 states and the District of Columbia.
- Various state level consortia, such as the Indiana Higher Education Telecommunications System (IHETS) and OneNet, the Oklahoma Telecommunications Network. Mississippi State University began to deliver interactive video courses in 1993 and provided more than 100 courses to 200 sites throughout its state and to locations as far away as Hawaii, the Philippines, and Japan.
- An interactive video distance learning project called Project Jump Start was carried out in 1995 at Buffalo State College in New York State, with courses taught to college and high school students in 14 undergraduate subjects and funded through a cooperative arrangement between Bell Atlantic and the Center for Applied Research in Interactive Technologies (CARIT).

In recent years, all these systems have had to accommodate their programming to the emergence of online technologies, in some cases by closing programs and in others by merging what can be offered by the two technologies. The satellite-delivered program can be more suitable for presentations of live lectures, demonstrations, or films; the online program provides opportunity for small group interactivity, communication from individual participants to instructors, and in-depth follow-up search activities.

You will find more about today's consortia in Chapter 3.

Business TV

The latter half of the 1980s and the 1990s saw the emergence of a large distance education industry outside higher education, with training for corporations and continuing education for the professions delivered through "Business TV"—that is, interactive video and audio delivered by satellite. By 1987 a study of Fortune 500 companies showed half using this delivery system. IBM had its Interactive Satellite Education Network (ISEN) with originating studios in 4 cities, and receiving sites in 13. Federal Express had daily programs to 800 downlinks nationwide. Kodak Corporation sent twice weekly, 2-hour-long training programs nationwide. Tandem Computers broadcasted to 11 European countries as well as to 72 sites in North America. Finally, Domino's Pizza sent a mobile uplink to any store in the country where an employee had something to teach the rest.

For organizations not having their own satellite networks, time could be bought on one of several business satellite networks. An example was AREN, the American Rehabilitation Educational Network, which provided professional continuing education for health care professionals at nearly 100 sites nationwide. One of AREN's programs, Management Vision, was broadcast to 240 sites in 1986–1987 and 650 sites in 1987–1988. Corporations made up 60 percent of Management Vision subscribers, hospitals 30 percent, and colleges most of the remainder.

The Public Service Satellite Consortium (PSSC) was a collaborative group representing a broad spectrum of business TV users, such as the American Hospital Association, the American Law Institute, American Bar Association, the National Education Association, the AFL–CIO, and the U.S. Chamber of Commerce. All of these organizations used satellites on a regular basis in their continuing education programs. For example, The Health Education Network was a subscription-driven network with over 300 hospital members, focusing on in-service training of medical personnel and patient education with approximately 40 programs monthly.

Interactive Video in the K–12 Schools

In 1987 the federal Star Schools Program Assistance Act was passed by Congress. The Act authorized a 5-year budget of $100 million to promote the use of telecommunications for instruction in math, science, and foreign languages at the K–12 level. The program stipulated that funds be allocated to state-level partnerships, and it required matching funds from the participating states. The Office of Educational Research and Improvement in the Federal Department of Education administered the Star Schools program. The first award under this project was for $19 million a year, for two years, to four regional partnerships. The Midlands Consortium consisted of five universities in four states; the TI-In network based in Texas included three state agencies, four universities, and a private corporation, Ti-in Inc. Additionally, $5.6 million was awarded to a third consortium of state education agencies and state television authorities, SERC, to provide high school courses in 19 states. These consortia covered 45 states and reached almost 3,000 schools. They provided over 8,000 students with high school credit courses; 32,037 participated in science programs. In 1990

four new grants, totaling $14,813,000, were awarded to consortia located in the northeastern and northwestern United States.

The Star Schools program had tremendous impact on distance education in K–12 classrooms, particularly in getting equipment installed and programs developed, and providing teachers with training (Martin, 1993; Worley, 1993). One of the most important effects of the project was to stimulate collaboration among provider agencies located in different states to deliver across state boundaries.

In addition to the Star School consortia, many states established their own satellite interactive television efforts for school instruction. The National Governors' Association Report for 1989 reported that 10 states operated a statewide or regional teleconference education network, and 14 were planning one.

Two-Way Video-Conferencing

The Star Schools, university, and business TV systems described previously used one-way video/two-way audio communications. Participants at all sites could see and hear the presenters from the originating site, but they could only respond by audio. Participants could not see other participants, only hear them. As the 1990s wore on, two-way video-conferencing became more widely available.

There are several ways of providing two-way video-conferencing. The older and more expensive method provided signals from one studio to another using technology that transmitted data at "T1" (1.5 megabits per second). The video signals were compressed by a device called a *codec*. The earliest codecs were as large as a refrigerator, but by the mid-1990s they could be fitted inside a personal computer so that video-conferencing became possible at transmission rates as low as 56 kbps (kilobits per second). Using a T1 network, Michael G. Moore at Penn State University initiated the first full graduate courses delivered by two-way compressed video teleconference in January 1986, linking students in a studio on the campus at University Park with groups in Erie, Pennsylvania.

Two-way or multipoint video-conferencing became easier and less costly with the development of fiber-optic telephone lines that permitted transmission of higher data rates, which allowed video-conferencing between small groups of learners or individual learners and their instructors, with the video displayed on personal computers.

Fifth Generation: Computer- and Internet-based Virtual Classes

Computer Networks

The early computer systems developed in the 1960s and 1970s were large mainframes that involved rooms full of equipment. They were connected to terminals with keyboards either by coaxial cables within buildings, or remotely by using telephone connections. A precursor of computer networking was the project developed during the 1970s at the University of Illinois: called the PLATO (Programmed Logic for Automatic Teaching) project, it allowed a number of sites to communicate via either dial-up lines or dedicated connections. PLATO introduced the idea of an electronic network form of instruction, as well as originating a number of well-known commercial products, such as Lotus Notes (Inglis, Ling, & Joosten, 1999).

After Intel invented the microprocessor in 1971, and the first personal computer, the Altair 8800, came onto the market in 1975, the use of computer-based instruction increased significantly. By 1989, according to the U.S. Bureau of the Census, 15 percent of all households in the United States had a personal computer and nearly half of all children had access to computers at home or in school. In addition, graphics, color, and sound became possible, and authoring languages made computer-based instruction easier to develop. But most importantly, the cost barriers to availability of computers came down. Educational software (also called courseware) became a major business enterprise and thousands of programs were published at all levels and in all subject domains. In 1969 the U.S. Department of Defense, through its Advanced Research Projects Agency (ARPA), set up a network to link the computers of the armed forces, universities, and defense contractors, forming the basis for what evolved into the Internet. The Internet found its way to education in 1980 when Duke University students started a system called USENET, and at about the same time Ira Fuchs at the City University of New York (CUNY) and Greydon Freeman at Yale University invented BITNET ("Because It's Time Network"). This became the first major Internet dedicated solely to education, beginning with the first link between CUNY and Yale and expanding to almost 500 organizations and 3,000 nodes (all educational institutions) by 1991, after which it declined. Also in the mid-1980s, the National Sciences Foundation (NSF) developed NFSNet, a network of five supercomputer centers connected to universities and research organizations. NFSNet was upgraded in 1987 and again in 1992. Like BITNET, it could be used for exchanging e-mail and data files, and accessing bulletin boards and library facilities (Inglis, Ling, & Joosten, 1999).

The earliest way of linking computers for instruction of groups rather than individuals was referred to as audio-graphics. The graphics were transmitted to a computer on one telephone line to enhance the audio presentation on another line. Peripherals attached to the computers included tablets and light pens, cameras to transmit slow-scan pictures, and scanners for transmitting documents. When linked through a bridge, the computers at a number of sites allowed students and teachers to interact in real time with the graphic and visual images as well as with the audio messages. As early as 1989, Moore at the Pennsylvania State University began experimenting in using audio-graphics delivered through BITNET as a way of internationalizing teaching about distance education, teaching full graduate courses to cohorts of students in Mexico, Finland, and Estonia, as well as in the United States. Another major experiment in distance education

...puter conferencing was the Electronic University Network. This was an ...aduate degree program earned by taking courses from 19 universities ...creditation awarded by Thomas Edison College in New Jersey. Courses ...elivered on computer disk and in print; interaction with instructors ...l through computer, telephone, and mail. The New Jersey Institute of ...logy developed a similar program.

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...as each previous generation of technology—that is, correspondence, ...t radio and television, and interactive video and audio conferencing— ...d its particular form of distance learning organization, the spread of ...technology stimulated new thinking about how to organize distance ...This has been the case in established single-mode open universities ...respondence schools, but also especially in dual-mode institutions and ...ngle-mode, face-to-face teaching institutions that never before consid- ...tance education but are now converting to dual-mode status. New tech- ...has also led to the emergence of new forms of single-mode, purely ...ic universities and to new combinations and collaborations among insti- ...of all types. (For more on this, see Chapter 3.) Finally, for in-depth ...reviews of the history of distance education, see Pittman (2003), Feasley ...ker (2007), and Black (2007).

VIEWPOINT

Von Pittman

The Empire Strikes Back

Distance education's future within American higher education will become even more contentious. During the second two decades of the twentieth century, both the number of universities offering correspondence programs and students enrolling in them grew rapidly. Because the correspondence funding model supported neither residential facilities nor programs, presidents and professors perceived them as a threat to the established order. Critics attacked the collegiate programs by equating them with the outrageous advertising, substandard practices, and sullied reputations of the worst of the commercial—or "proprietary"—correspondence schools that taught noncollegiate subjects, from auto repair to taxidermy, via the mails.

Now that online programs have become extremely popular, they are threatening—and drawing the scorn of—faculty and some administrations for the same reasons correspondence study did decades earlier. Distance education's current critics within the academy point to the deservedly shoddy reputations of some of the more notorious online proprietary schools. But this time, higher education's lobbyists have taken their fight to the legislative level, where the first order of business is to continue directing the greatest part of federal financial aid funds to residential students of traditional college age. Online programs, whether at rapacious proprietary institutions or respected universities, will be forced to submit to the government extensive reports on such matters as default rates and employment prospects of online program students. Residential programs apparently will not have to undergo this kind of scrutiny. That, of course, is the point.

Source: Von Pittman, University of Missouri

Summary

Distance education has evolved through five generations, identifiable by the principal communications technology employed.

1. The first generation of correspondence/home/independent study provided the foundation for individualized instruction at a distance.

2. The second generation of broadcast radio and television had little or no interaction between teachers and learners except when linked to a correspondence course, but added the oral and visual dimensions to the presentation of information to distance learners.

3. The third generation—the open universities—emerged from American experiments that integrated audio/video and correspondence together with face-to-face tutorials, using course teams and an industrial approach to the design and delivery of instruction in a systems approach.

4. The fourth generation used interactive teleconferencing by audio, video, and computer, giving the first real-time interaction between learners and learners, as well as learners and instructors at a distance. This was especially favored in corporate training.

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Arrival of the Internet and Web-based Education

The use of computer networking for distance education got a big boost with the arrival of the World Wide Web, a seemingly magical system that allowed a document to be accessed by different computers separated by any distance, running different software, operational systems, and different screen resolutions. The first Web browser, called Mosaic, appeared in 1993, and it was this software that gave educators a powerful new way of opening access to learning at a distance. It has been estimated that in 1992 the Web contained only 50 pages, but by 2000, the number of pages had risen to at least one billion (Maddux, 2001). In 1995, only 9 percent of American adults accessed the Internet. By 2010, some 77 percent of all Americans had Internet access (Miniwatts Marketing Group. (2010)).

In the 1990s, a number of universities started running Web-based programs. Examples of early providers of entire degree programs offered through the Web included the Online Campus of the New York Institute of Technology, Connect Ed in partnership with the New School for Social Research in New York, and the International School of Information Management. Jones International University (JIU) was originally established in 1987 by entrepreneur Glenn Jones—when it was called Mind Extension University. Mind Extension University provided courses through cable television, but it turned to the Web in 1995, changed its name, and claimed to be "the first fully online, accredited university" (http://www.jonesinternational.edu/).

Just as each previous generation of technology—that is, correspondence, broadcast radio and television, and interactive video and audio conferencing—produced its particular form of distance learning organization, the spread of Internet technology stimulated new thinking about how to organize distance teaching. This has been the case in established single-mode open universities and correspondence schools, but also especially in dual-mode institutions and those single-mode, face-to-face teaching institutions that never before considered distance education but are now converting to dual-mode status. New technology has also led to the emergence of new forms of single-mode, purely electronic universities and to new combinations and collaborations among institutions of all types. (For more on this, see Chapter 3.) Finally, for in-depth research reviews of the history of distance education, see Pittman (2003), Feasley and Bunker (2007), and Black (2007).

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5. The fifth generation of online Internet-based virtual classes has led to a worldwide explosion of interest and activity in distance education, with new organizational structures; collaborative constructivist learning methods; and the convergence of text, audio, and video on a single communications platform.

Questions for Discussion or Further Study

1. What similarities and differences can you see in the methods used for designing and delivering instruction in each of the five generations in the history of distance education?

2. What similarities and differences do you see in the learner populations in each of these generations?

3. Why couldn't the United States develop a national open university? Was this a good thing?

4. Do you detect any differences or changes in the motivation of the institutions that provide distance education in the latest generation, compared to the others?

5. Discuss Von Pittman's viewpoint.

The Scope of Distance Education

M oving from concept and history, as described in previous chapters, we now turn to review the current extent of distance education by introducing the main types of institutions and some examples of their programs. This chapter looks in turn at private "for-profit" schools, public universities and community colleges, consortia of different institutions, K–12 education, corporations, the armed forces, and professional continuing education. Each of these is a vast area of activity, and since we assume you will follow up this introduction by exploring areas of personal interest, we give you pointers to relevant Web sites for that purpose.[1]

Distance Education in "For-Profit" Schools

Today as in the past, millions of people in the United States study in distance education programs delivered by private schools that have evolved from the "home study" schools mentioned in the last chapter. The main "for-profit" home study schools are accredited by the Distance Education and Training Council (http://www.detc.org), which estimates that more than 3 million people enroll in their courses every year. The Council accredits more than 60 schools offering more than 1,000 different vocational subjects, such as training of beauticians, paralegal staff, medical assistants, child care workers, computer repair technicians, hotel managers, and travel agents. While such vocational subjects have been the traditional fare offered in the for-profit sector, a significant trend of the past decade has been the growth in schools offering academic and professional courses at associate and master's degree levels. Representative of this