

## Chapter 3

### **FACTORS OF DISTANCE LEARNING**

Distance learning, where the learner can be anywhere, anytime, is an important component of the future learning system discussed in this book. Often people have a limited view of the various types of distance learning that can be conceived; for some, distance learning is ‘what I do.’

We need to consider the full range of possible types of distance learning. This chapter will provide that examination. Many different factors determine just what kinds of distance learning are to be found, or are possible. Most of these choices are spectra, not just a simple yes/no choice.

These myriad possibilities lead to a variety of distance learning strategies. Some are closely aligned with the visions in the last chapter. The following chapter discusses some realizations of these possibilities of distance learning, and later chapters develop a new possibility.

Although distance education is a ‘hot’ topic, how well do we understand it? Our definitions and expectations of distance education tend to be fuzzy. New firms, alternative organizational models, and venture capital funds are emerging with startling rapidity, further complicating matters.

Diana Oblinger and Jill Kidwell  
Are We Being Realistic?

EDUCAUSE Review, May/June 2000, page 31-39

### **3.1 Learning paradigm**

A key factor in learning is the underlying view of the learning process, the paradigm. The developer or deliverer of learning units seldom actively makes the choice of learning paradigm. This important choice is almost always an unconsciousness decision, influenced by the current dominant paradigm. Our concern is with paradigms for distance learning.

#### **3.1.1 Information transfer**

Almost all learning efforts for centuries, both conventional and distance learning, have followed a paradigm that can be called the information transfer paradigm. It sees the learning activity as transferring information for a knowledgeable individual to a student, through some intervening media. The focus is on information.

In schools, universities, and training, lectures, video, and print material are the dominant media for information transfer, with lectures the most common. In distance learning following this paradigm the dominant media is video, often similar to lectures, or print-based computer units, as in current web courses online. Verification of learning is based on testing of memory of either information or procedures.

We have argued (EDUCAUSE Review, January/February 2000, and elsewhere), that this paradigm is inadequate for learning in the new century. Learning today has many needs that can not be met by information transfer, including learning problem solving, intuition, and creativity. Further many of the students using information transfer as it now exists do not learn fully. Memory is not enough in the twenty-first century. We need to look beyond information transfer, changing the paradigm for learning.

#### **3.1.2 Tutorial learning**

The new paradigm that seems desirable, for distance learning and all learning, is tutorial learning. Human tutors have long been used. Perhaps the most famous example of tutorial learning is 2500 years ago, with Socrates. Oxford and Cambridge used the tutorial method. Every major physicist in 19<sup>th</sup> century United Kingdom, including Maxwell, Tait, and Kelvin, studied with the same tutor at Cambridge, Hopkins. Many other examples can be cited, mostly for the children of the wealthy who had their own tutors at home.

Tutorial learning with skilled tutors is often effective for learning, but it is very expensive and we do not have nearly enough skilled tutors. We could never have learning with human tutors as a dominant learning paradigm today.

But modern digital and communications technologies now make tutorial learning possible, with the computer as the tutor, for all for distance learning, if suitable highly interactive learning material is developed. This will be a major enterprise.

We will return to this possibility of computer-based tutorial distance learning in more detail in chapter 7 and in other sections of this book. Changing the paradigm will not be easy.

Peter Drucker commented recently, "change is an opportunity, not a threat." (<http://pfd.org/publications/news/may2000/news.html>).

Perhaps all of the stakeholders of higher education are caught in a paradigm paralysis. We have difficulty changing the way we think and the way we believe . . . To break this barrier we should consider asking some new questions.

Michael Hooper  
The Transformation of Higher Education  
In Oblinger, D., S. Rush, The Learning Revolution  
Asker, Boston, MA, 1997

### 3.2 Level of interaction

A critical question for learning is how active the student is. Most educational psychologists agree that active learning is better than passive learning. In a lecture environment, particularly in large courses, often very little time is allowed for each student to ask questions. Questions asked by the instructor are often rhetorical, and few students answer them. The activity is called teacher-centered, with the instructor talking almost all of the time. Reading for most students is also a one-way activity. Today learning on the web is primarily with reading or watching video, with little interaction.

Communication in two directions is essential for best learning, but it is seldom found in learning today. It does happen with good human tutors, and it can happen with computer-based tutors. Distance learning might involve various levels of interaction.

### **3.2.1 Computer based interaction**

In tutorial learning with computers the interaction is intense, with both the computer and the learner playing a very active role, and with each interaction being of high quality.

This will be discussed in detail in Chapter 6.

### **3.2.2 Peer interaction**

Peer learning provides another possibility for interaction in distance learning. When a small group of students (perhaps four) work together in a peer learning environment, perhaps with a highly interactive computer program, the interaction is high; it could be called conversational. These groups could be close together physically, or could be remote groups connected through the technology.

A given example of distance learning can be evaluated in terms of the interaction possible for each student. Both frequency of interactions and the quality of each interaction are important in considering the level of interaction as discussed in Chapters 6 and 7. Again we find spectra, wide ranges for each of these factors.

## **3.3 Student locations**

Distance learning implies that the students learning are not physically at the formal institutions of learning, such as schools, universities, and corporate training centers.

This leaves many possibilities as to the locations of the students.

### **3.3.1 One or many locations**

The remote students may be clustered together, perhaps in a series of classrooms in other institutions. This was the situation in the Chinese TV University when visited several years ago. With this arrangement the students are still together, as they would have been at the offering institution, but elsewhere. There may be only one, or many such distant groups.

At the other extreme, very large numbers of individuals may be learning at many individual locations. They might be in their homes, in public environments such as libraries, museums, and shopping centers, or in many formal institutions. They might be sitting under a tree, or at the seashore. Perhaps two or three students might work

together in groups, gaining the advantages of peer learning as just discussed.

### **3.3.2 Close or far**

Often the distance learning locations are close together, perhaps in a near community to the originating school or universities. This was the situation for the Stanford University engineering courses, given at nearby companies through video.

The other extreme is that they can be widely separated geographically. The students might even be worldwide, although there are few examples of this kind so far. We expect this to become much more common in the near future, as more effective distance learning units are developed and moved to many languages and cultures.

## **3.4 Time constraints**

Distance learning can involve various time constraints. They are discussed in the next two sections.

### **3.4.1 Beginning time**

In formal institutions classes almost always begin at fixed times. This comes from a period before computers when management practices and instructor availability and convenience demanded this.

The other extreme is that a learning segment can begin for each student at any time: on any day, twenty-four hours of the day. This is possible with today's technology, but still not common.

### **3.4.2 Pacing**

Formal institutions differ from the possibilities in distance learning, with regard to student pacing. In traditional activities the learning time is fixed for a particular learning segments.

Distance learning, in some forms, allows the pacing to depend on each student. Each student takes a different time to complete each segment, depending on the background and needs of that student.

### 3.5 Size of learning segments

In our schools and universities, the usual length of a learning segment is a course, lasting a quarter, a semester, or a year. The learning material included may depend on the schedule of the institution – the length of the year, quarter or semester. In universities, professors argue seemingly endlessly about the advantage of quarters and semesters.

But another possibility is that segments can be of any length. Distance learning can follow either strategy, although fixed lengths are most common so far.

For flexibility we might find a future situation in which units are relatively small, so students could have different paths in learning, depending on their needs. Students need not be aware of the size of distance learning units. The process can appear continuous to the student, with learning in a given subject lasting for years or for life. In this situation, the concept of 'course' is no longer useful.

### 3.6 Student control of content

Learning can provide no or limited content choice to the student, as in most existing courses, or it can turn over all choice of content to the individual student. This last possibility is not likely, although some people seem to think it is ideal. Partial student control of content seems more likely.

As an example of an intermediate strategy, the online physics course we developed about twenty five years ago at the University of California, Irvine was based on two sets of material, different approaches to engineering physics. We specified six paths through the material, with the student choosing the path at each diverging point. For a meaningful choice, the student must understand the alternatives, a nontrivial responsibility of course developers.

### 3.7 Years of learning

We can no longer assume that learning occurs only for the years 5 to 25, the school and university years. In our rapidly changing world learning can and should be lifelong, a continuous activity from cradle to grave, as we emphasize in this book. This should include both very early learning and many stages of adult learning. However, breaks in learning are possible.

### **3.8 Student support**

Distance learning can provide various aids to students.

#### **3.8.1 Helping students in trouble**

Students may not have a smooth learning path. They may, for a wide variety of reasons, encounter learning problems. A critical step for efficient learning is to locate student problems, often not understood by the student, and offer appropriate assistance.

A learning system can provide many types of help to the student for learning problems. In older learning this was often provided partially by office hours and discussion sections, not enough for many students. More recently this help has come through electronic means, such as email or chat rooms, tactics that work only for small numbers of students. In the United Kingdom Open University tutors throughout the British Isles provide this assistance.

With distance learning the electronic means are also possible. But another possibility for such help is from the learning material itself. It can actively seek out the student problems, and offer interactive aid. This approach for assisting students will be explored in detail in this book.

#### **3.8.2 Peer learning**

An important kind of student support comes from other students, already mentioned. Peer learning, between students at the same point in learning activities, or as tutors to other students, is a valuable aid to learning. In traditional institutions this is seldom openly encouraged.

A distance learning activity may or may not encourage peer learning. Many opportunities are available when computers play a major role in the learning activities. Programs can encourage and aid in the creating of learning circles of students, both physically with students close together and electronically for those far apart. This could be through email, or could involve more detailed interaction.

If the computer is storing frequent records of each student, as we will suggest, background programs can search these records. The computer can encourage students, at the same point in learning, perhaps those having the same learning problems or the same zone of proximal development (considered later), to work together. Or the computer learning programs can encourage students who have learned

some material to aid others who are still trying to master the unit, a valuable learning experience for both.

### **3.9 Teachers or no teachers**

It is often assumed that teachers are essential for learning. But it is clear from everyday experiences and from many studies that much learning occurs without teachers. In childhood marvelous early learning occurs, such as the learning of an initial language. Much adult learning is without teachers.

Distance learning may or may not involve teachers. As the number of students increases to the thousands or beyond, as discussed in the next section, the concept of 'teacher' becomes vague, even impossible. In the system described in this book, teachers in the usual are very unlikely except in special situations.

### **3.10 Number of students**

A recent online discussion asked about the 'ideal' numbers of students in distance learning environments. Several people on the list, from United States universities, recommended 20 or 25 students. They were basing this on the type of distance learning now common in United States universities.

On the other hand, some of the foundation courses in the United Kingdom Open University have over 10,000 students. Clearly as suggested many forms of distance learning are possible. So a wide range of numbers is possible, with different types of distance learning.

The problems of education are universal, in a world with six billion people, many having no or limited schools available. Distance learning, in some form, may be the best possibility for reaching everyone, at all ages. So we would need to address these problems a form of distance learning suitable for very large numbers. This will be discussed further later, as the system suggested here is for many students.

### **3.11 Grading or mastery**

In schools and universities almost all students are given a grade. Several grading systems are available, with students spread over a range from good to bad. These grades are determined primarily by examinations, although other methods such as portfolios have also

been tried. In large courses tests are, unfortunately, often multiple choice exams (called multiple guess by students.) These grades are taken as an indication that some students have not learned the material. Many distance learning environments are based on this grading strategy. But such cases as Albert Einstein, a poor student in school with low grades, lead us to question the value of grades.

Benjamin Bloom and others suggest another approach. He noted, in extensive experiments he and his students conducted in the Chicago public school, that with a tutorial approach, with human tutors, almost all students could learn. This is mastery learning; almost all students learn everything. Everyone succeeds. The problem he raised in the "Two Sigma" paper was how to accomplish this in a way that is feasible economically for the large numbers of students we now have. We hope to address that problem.

A major difference between grades and mastery is the role of examinations, student evaluations. As noted, they are typically used to assign grades in approaches that require grades. However, in mastery courses evaluation determines what new learning material to present next for each student.

For mastery we locate student learning problems and offer effective assistance offered, perhaps with several different sets of learning material. This is further discussed in Chapter 9.

### **3.12 Cost factors**

We cannot ignore the costs associated with learning. These must be affordable by the individual and by the society. For learning both development and delivery cost, and other costs, are important. We should better understand the costs of traditional learning and distance learning.

Courses in traditional institutes often cost very little to develop. Most of this cost is in the time the instructor devotes to the course, both before and during the course. The major consideration before delivering the course is often the selection of a textbook.

When these same individuals work in distance learning, the costs are similar, because they are still using the same paradigm. But other approaches might involve very different costs.

With learning, including distance learning, several factors concerning costs are important. Different systems will have different costs. Chapter 12 is devoted to the cost problem, focusing on the costs of the tutorial system recommended in this book.

### **3.12.1 Cost of development**

A learning segment to be delivered at a distance involves some costs of development. As with the other factors discussed, there can be a wide range of expenses. Often, even commercially, there is not a clear view of total costs. Our experiences are that textbook publishers often not have a complete view of the expenses involved.

We had major curriculum developments in the United States in the period immediately following the USSR Sputnik, over a wide range of subjects and levels. A more recent data point with regard to distance learning is the United Kingdom Open University. So they give us a basis for comparison, used in Chapter 12.

Spending large sums on development will not guarantee high quality learning. However, good units for distance learning will be costly.

### **3.12.2 Cost for a student hour**

Costs of development are not the most critical costs in considering distance learning, although they are the most frequently mentioned item. From the standpoint of both the individual and the society (the country or the world) the most important factor is the cost for a student hour, including development, delivery, possible profit, and administrative costs. In calculating the cost for a student hour of learning it is important to consider all costs, even those sometimes hidden.

Expensive development can lead to high quality learning material, at low costs per hour, if the delivery system is inexpensive and if large numbers of students use the learning units. When we think of the learning problems of the world, and solutions to these problems, large-scale distance learning with many students is likely to be very important.

## **3.13 Evaluation**

Learning material should be evaluated for learning effectiveness, but often it is not. Evaluation can occur at various levels, both formative and summative evaluation

### **3.14 Delivery method**

Many delivery methods for distance learning are possible, even within the same product, including mail, email, cable, CD-ROM, DVD-ROM, Internet, local wireless delivery, and satellite. A given product may be delivered in several ways.

The nature of the learning, and the costs, may determine delivery procedure is to be used. We will discuss the delivery methods available today and how they could be used. For flexibility, we might use several delivery methods for the same material, so we need not pick just one.

### **3.15 Learning subjects**

A given learning program might offer a single learning sequence, or an unrelated collection of such sequences. It might involve one or several degree programs, or a very wide range of material.

The facility might offer a typical school or university range of units, might be concerned with pre-school activities, after school materials, adult learning, training, new subjects, or some combination of these.

### **3.16 Credit or noncredit**

Learning may be in an environment that offers credit or certification. Or the learning may be undertaken with no idea of attaining such status. Adult learning is often without credit.

### **3.17 Profit or nonprofit**

The learning segments may be offered for profit or may not be part of a nonprofit organization, such as at a state university.

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