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The Virtual class on the internet

Ja-Eun Shin

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in candidacy for the degree of Master of Fine Arts

THE VIRTUAL CLASS ON THE INTERNET

Ja-Eun Shin
Computer Graphic Design
March 2000
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SUMMARY

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ABSTRACT

Distance learning is not a new subject, but it recently has come in vogue again. With the advent of new educational and training technologies and the need to meet the needs of learners in a fast-paced world, distance learning is becoming a necessity. In its best sense, it can help educate more people anywhere at any time. Our renewed interest in distance learning has the potential to change public perception of education and its ongoing importance throughout our lives.

In Part I, an overview of the distance learning is given, from the concept to the various tools. The tools and procedures are primarily emphasized, which offer us a basic idea of the virtual classroom. An extensive description of the software and the learning processes is then provided. The thesis project is detailed in Part II, which describes the possibilities of using this technology as a virtual class on the web.
PART I. DISTANCE LEARNING OVERVIEW
1. A DESCRIPTION of DISTANCE LEARNING

'Distance education' is a generic term that includes the range of teaching/learning strategies used by correspondence colleges, open universities, distance departments of conventional colleges or universities and distance training units of corporate providers. It is a term for the education of those who choose not to attend the schools, colleges and universities of the world but study at their home, or sometimes their workplace.

From the outset it can be seen that this form of education crosses the sectoral boundaries into which the study of education is normally divided, with major points of focus on:

- Children's education at a distance;
- Further education at a distance for vocational qualifications (distance training);
- higher education at a distance for university qualifications (university-level distance education);
- corporate distance training (in-house courses in which the public may not be invited to enroll).

A complete title for the field would, therefore, be 'distance education and training'. 'Distance education' is used as a shorter form of this.

1. A DEFINITION OF DISTANCE EDUCATION

A clear idea of what is the subject of discussion is essential in a book on an area of study in which there has been much confusion about terminology. A clear definition is also important in the rather ill-defined areas of non-traditional education, open education, and flexible education. It is important to be able to say whether distance education is to be regarded as the same as or different from a university without walls, extramural studies, experiential learning, off-campus education, open learning, extended campus, the American external degree, or university extension.
A satisfactory framework for definition in education is provided by the American educational philosopher Scheffler (1968), who presented the scheme shown in Figure 1.1 for classifying different types of definition.

Scheffler sees scientific definitions as being based on special knowledge which is used to construct a network of theory adequate to all available facts encompassed in the definition, whereas general definitions are statements that a given term is to be understood in a certain way for the space of some discussions or for several discussions.

Scheffler claims there are three types of general definitions: stipulative, descriptive, and programmatic. Stipulative definitions state that a given term is to be taken as equivalent to some other given term within a particular context. This is not the type of definition needed here, as a stipulative definition does not claim to reflect the previously accepted usage of the defined term. A general descriptive definition answers the question 'What does that term mean?' it not only serves as a convention for usage in discussion but also always explains the defined term by giving an account of its prior usage. A programmatic definition is a definition with a purpose, a program: it seeks to include additional items within a term or to exclude from a term elements which people had previously thought were included.

In Scheffler's terms this study commences with a general descriptive definition and seeks to proceed by feedback and refinement towards a scientific definition of distance education.

It seems appropriate to begin with a search of the literature for 'authoritative or accepted definitions and to analyze them for their common elements. Distance education, however, has a history which spans a hundred years and more, and the elements of a definition that can be established by this process do not therefore exist as abstractions; they must correspond to the reality.

It is proposed, therefore, to examine the definition being developed in the context of existing institutions, then to consider more recent definitions before re-examining the definition established in the light

I. A Description of Distance Learning
of existing institutions. The process is then continued: it is cyclic and continuous. If the search of the literature is extensive and if the case-studies of institutions to which the nascent definition is applied are wide and varied, it should be possible within the confines of this chapter to produce a definition instrument capable of delineating all educational institutions either into the category 'distance education' and hence subjects within the scope of this book, or of excluding them and therefore to regard them as the subject of other studies.

1) EARLY DEFINITIONS

① G. Dohmen (1967)

Distance education is a systematically organized form of self-study in which student counselling, the presentation of learning material and the securing and supervising of students' success is carried out by a team of teachers, each of whom has responsibilities. It is made possible at a distance by means of media which can cover long distances. The opposite of 'distance education' is 'direct education' or 'face-to-face education': a type of education that takes place with direct contact between lecturers and students.

(Dohmen 1967:9)

② O. Peters (1973)

Distance teaching/education is a method of imparting knowledge, skills and attitudes which is rationalized by the application of division of labour and organizational principles as well as by the extensive use of technical media, especially for the purpose of reproducing high quality teaching material which makes it possible to instruct great numbers of students at the same time wherever they live. It is an industrialized form of teaching and learning. (Peters 1973: 206)

③ M. Moore (1973)

Distance teaching may be defined as the family of instructional methods in which the teaching behaviors are executed apart from the learning behaviors, including those that in a contiguous situation would be
performed in the learner presence, so that communication between the teacher and the learner must be facilitated by print, electronic, mechanical or other devices. (Moore 1973: 664; 1977: 8)

④ B. Holmberg (1977)

The term 'distance education' covers the various forms of study at all levels which are not under the continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises, but which, nevertheless, benefit from the planning, guidance and tuition of a tutorial organization. (Holmberg 1977: 9)

Analysis of these definitions leads to the recognition of certain common elements. The separation of teacher and learner is fundamental to all forms of distance education whether they be print-based, audio/radio-based, video/television-based, or computer-based. This separation differentiates distance education from all forms of conventional, face-to-face, direct teaching and learning. The structuring of learning materials and the linking of these learning materials to effective learning by students through an educational organization differentiates distance education from private study, learning from interesting books or cultural television programs.

2) RECENT DEFINITIONS

Indicative of more recent efforts to define this area of education are:

① D. Garrison and D. Shale (1987)

Distance education implies that the majority of educational communication between (among) teacher and student(s) occurs non-contiguously. It must involve two-way communication between (among) teacher and student(s) for the purpose of facilitating and supporting the educational process. It uses technology to mediate the necessary two-way communication.(Garrison and Shale 1987: 11)
B. Barker and others (1989)

Barker and his colleagues argue for the broadening of the definition of distance education in the light of the new telecommunications technologies. They write:

Telecommunications-based distance education approaches are an extension beyond the limits of correspondence study. The teaching-learning experience for both instructor and student(s) occurs simultaneously - it is contiguous in time. When an audio and/or video communication link is employed, the opportunity for live teacher-student exchanges in real time is possible, thereby permitting immediate response to student inquiries and comments. Much like a traditional classroom setting, students can seek on-the-spot clarification from the speaker. (Barker et al. 1989: 25)

M. Moore (1990)

Distance education is all arrangements for providing instruction through print or electronic communications media to persons engaged in planned learning in a place or time different from that of the instructor or instructors. (Moore 1990: xv)

P. Portway and C. Lane (1994)

The term 'distance education' refers to teaching and learning situations in which the instructor and the learner or learners are geographically separated, and therefore, rely on electronic devices and print materials for instructional delivery. Distance education includes distance teaching - the instructor's role in the process - and distance learning - the student's role in the process. (Lane 1994: 195).

In the light of these considerations the following definition of distance education is proposed.

Distance education is a form of education characterized by:
the quasi-permanent separation of teacher and learner throughout the length of the learning process (this distinguishes it from conventional face-to-face education);

- the influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services (this distinguishes it from private study and teach-yourself programs);

- the use of technical media - print, audio, video or computer - to unite teacher and learner and carry the content of the course;

- the provision of two-way communication so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education); and

- the quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals rather than in groups, with the possibility of occasional meetings, either face-to-face or by electronic means, for both didactic and socialization purposes.

The definition seeks to take up the middle ground between the extremes of defining distance education so narrowly that it becomes an abstraction which does not correspond to existing reality, or so broadly that it becomes meaningless as the basis for analysis and the development of grounded theory.

Comparative studies of distance systems show that the element of face-to-face contact may be either non-existent, compulsory, or voluntary. The volume of face-to-face contact that would be consistent with the definition adopted for this study is indicated by the phrase 'the quasi-permanent separation of the learner from the teacher and from the learning group throughout the length of the learning process'. The use of virtual classrooms by satellite, full bandwidth, compressed video or microwave links enables much of the content of a course to be taught at a distance.

The goal of this chapter has been to provide an accurate definition of distance education but not of all possibilities of educating at a distance. The range of 'education at a distance' is too vast and comprises both distance education as defined here and a range of other resource-based teaching and learning strategies. If the confusion of the past is to be avoided and if the goal of this study is to be achieved (the identification of a discrete area of educational activity in such a way that it can provide a basis for other scholars to build a valid theoretical structure and guides to good practice), then to be excluded from the concept of distance education are:

1. A Description of Distance Learning
• the use of printed, audio-based, video-based, or computer-based learning materials in classroom, lecture theatres, seminars, tutorial, and laboratory sessions for on-campus programs;
• the use of printed, audio-based, video-based learning materials and computers in private study.

2. THE BENEFITS OF DISTANCE LEARNING

Distance learning solutions can address many of the challenges facing education and training institutions. The following examples are only a few of the benefits that can be accrued.

• Distance learning can enhance the quality of education by speeding the process of information transfer between education providers and education receivers.
• Distance learning offers the promise of instant sharing of information among members of the community, speeding the research process and, consequently, the development of new products and services.
• Distance learning can resolve some of the financial problems facing universities by providing them with economies of scale. Through distance learning, a greater number of remote classes can be created, giving education providers the opportunity to generate more revenues per teacher or to reduce the tuition per student.
• By implementing distance learning solutions, a university can differentiate itself from other universities by being at the leading edge of technology.
• Through distance learning, government agencies can reduce the cost of retraining the structurally unemployed and welfare recipients. Distance learning enables corporations to upgrade the skills of their workforces to effectively compete in skill-intensive industries.
• Distance learning can reduce the training budgets of corporations by reducing costs of travel for educational purposes.
Educators and administrators who appreciate the positive value of distance learning are investing school capital and operating funds in DISTANCE LEARNING technology; in many schools and colleges, distance learning has become a line item in the operating budget.

3. BARRIERS TO THE GROWTH OF DISTANCE LEARNING

While distance learning affords education providers and receivers with a number of important benefits, a number of factors are likely to slow the potential growth of the distance learning market:

- Union resistance. Eager to protect the interests of their members, teachers' unions are likely to resist the growth of distance learning, fearing that such growth would result in the reduction of teaching jobs.
- High capital cost. The creation of distance learning systems requires an investment by education providers and receivers in the creation, maintenance, and operation of distance learning systems. Those costs can be substantial and in some cases are beyond the means of the education providers and receivers interested in implementing them. Planners must understand that technology acquisition without budget commitments on programming (including recurring communications costs) and training, will not result in a successful DISTANCE LEARNING experience.
- Teacher-related factors. Three teacher-related factors represent barriers to the growth of distance learning. The first is "technophobia," a teacher's fear of dealing with new technologies. The second is computer illiteracy in a portion of the teacher population. The third is teacher's reluctance to switch from traditional methods of teaching to technology-oriented approaches, a switch that sometimes requires a significant amount of effort.

4. KEY PLAYERS IN DISTANCE EDUCATION
The following briefly describes the roles of these key players in the distance education enterprise and the challenges they face.

Students - Meeting the instructional needs of students is the cornerstone of every effective distance education program, and the test by which all efforts in the field are judged. Regardless of the educational context, the primary role of the student is to learn. This is a daunting task under the best of circumstances, requiring motivation, planning, and an ability to analyze and apply the instructional content being taught. When instruction is delivered at a distance, additional challenges result because students are often separated from others sharing their backgrounds and interests, have few if any opportunities to interact with teachers outside of class, and must rely on technical linkages to bridge the gap separating class participants.

Faculty - The success of any distance education effort rests squarely on the shoulders of the faculty. In a traditional classroom setting, the instructor's responsibility includes assembling course content and developing an understanding of student needs. Special challenges confront those teaching at a distance. For example, the instructor must:

- Develop an understanding of the characteristics and needs of distant students with little first-hand experience and limited, if any, face-to-face contact.
- Adapt teaching styles taking into consideration the needs and expectations of multiple, often diverse, audiences.
- Develop a working understanding of delivery technology, while remaining focused on their teaching role.
- Function effectively as a skilled facilitator as well as content provider.

Facilitators - The instructor often finds it beneficial to rely on a site facilitatory to act as a bridge between the students and the instructor. To be effective, a facilitatory must understand the students being served and the instructor's expectations. Most importantly, the facilitatory must be willing to follow the directive established by the teacher. Where budget and logistics permit, the role of on-site facilitators has increased even in classes in which they have little, if any, content expertise. At a minimum, they set up equipment, collect assignments, proctor tests, and act as the instructor's on-site eyes and ears.

Support Staff - These individuals are the silent heroes of the distance education enterprise and
ensure that the myriad details required for program success are dealt with effectively. Most successful distance education programs consolidate support service functions to include student registration, materials duplication and distribution, textbook ordering, securing of copyright clearances, facilities scheduling, processing grade reports, managing technical resources, etc.. Support personnel are truly the glue that keeps the distance education effort together and on track.

Administrators - Although administrators are typically influential in planning an institution’s distance education program, they often lose contact or relinquish control to technical managers once the program is operational. Effective distance education administrators are more than idea people. They are consensus builders, decision makers, and referees. They work closely with technical and support service personnel, ensuring that technological resources are effectively deployed to further the institution’s academic mission. Most importantly, they maintain an academic focus, realizing that meeting the instructional needs of distant students is their ultimate responsibility.
II. TYPES OF DISTANCE LEARNING COURSES

Distance learning incorporates many different technologies, which range from something as simple as a mailed document to the more elaborate technologies of computers and broadcast media. Each type of distance learning can be effective and can help create a virtual classroom; however, different types of programs are especially well suited to different audiences and situations.

Although distance learning is not new, recently it has become more popular because of the Internet and World Wide Web but distance learning programs involve more than the use of computers. Distance learning programs may involve hardcopy documents, audiotapes, videotapes, disks, CDs, broadcasts, and e-mail, for example, used alone or in combination. The history of distance learning is an illustration of the rise in popularity and common usage of different technologies, but the future of distance learning depends on the ways newer technologies can be used most effectively to provide high-quality education and training to more people at a reasonable cost.

Before you plan a distance learning course, you should have a good idea of the range of technologies you might employ. Seldom will you choose just one method of sending and receiving information; most distance learning programs involve several ways to connect learners and educators/trainers. However, you usually have one primary means of presenting information, with secondary methods used to supplement course materials or establish communication among course participants. Knowing your options is a good first step in planning your distance learning course. The next sections describe some common forms of distance learning.

The virtual classroom can be created with any type of technology, simple or sophisticated. Some courses and subject areas are better suited to some distance learning technologies than others; some institutions or businesses prefer designing only one or a few types of distance learning courses. When you plan to develop a distance learning course, you have several options. The following sections highlight some common types of distance learning courses.

1. CORRESPONDENCE COURSES
Although distance learning currently is receiving a great deal of publicity in education and corporate training circles, it is not a new method of delivering information. Correspondence courses and independent studies have been used for years to provide mail-order education that learners can complete wherever and whenever it is easiest for them.

Early correspondence courses allowed learners to write to request course materials, which were then mailed. The learners read textbooks, booklets, and other instructional materials at their own pace, although there was usually a specified time frame when materials needed to be received from learners for some type of evaluation. The learners completed assignments and took examinations (which sometimes were proctored at another site to ensure that the learners did their own work without inappropriate study aids or assistance). Completed materials were then returned to the institution that originally sent the materials. Graded materials returned via mail completed the cycle.

Correspondence courses today may offer more diverse materials than the printed documents sent to and received from learners in the past. Today’s courses can involve videotapes, audiotapes, CDs, disks, and documents, depending on the types of materials that best present information about a certain topic. However, the “correspondence” part of the course remains much the same. Learners request information, which is sent by mail. Of course, faxed documents and e-mail can also play a role in this correspondence, but mail is still a cost-effective feature of these types of distance learning courses.

The effectiveness of this type of distance learning depends on the learners. Participants who do not do well with the first set of materials they receive may have to re-do assignments or take another examination before going on to the next set of materials, for example. Because learners work on their own, they may have trouble grasping difficult concepts or they may not understand the significance of one piece of information that really is a linchpin for understanding later information. Some learners need occasional guidance as they complete materials. However, learners who thrive on independence and are motivated by a genuine interest to know more about a subject or to develop a new skill often do better in a distance learning course. They can work quickly and make more progress in a short time than they would if they took a classroom-based course.

In ungraded courses that learners may take because they’re interested in a subject, not because they need high school, college, or university credit or job-preparation training, participants may simply move from one set of materials to the next, even though they have not mastered the previous level of knowl-
edge or skill. Although the participants are using materials quickly, they really aren't learning the subject matter. Again, the individual learner is responsible for mastering the subject matter.

Those learners who want to understand the materials will read them until they understand the topic or they'll seek assistance to help clarify confusing areas. Motivated learners will take their time with assignments and exercises, so that they develop their skills and relate what they've studied to practical applications. As with any type of instruction, including classroom-based courses or in-house training sessions, the effectiveness of correspondence courses, in the past and today, depends on individual learners' interests, ability to learn well on their own, and design of the educational materials.

Correspondence courses may be created by degree- or credit-granting institutions or businesses that evaluate learners' level of achievement. For example, adults who want to gain the equivalence of a high school diploma can take correspondence courses to prepare them for taking the GED examination. Other institutions or individual private vendors offer correspondence "classes" to help people prepare for a new career; university, college, high school, or equivalence credit usually aren't offered for these correspondence classes.

The home page of one degree-granting institution specializing in correspondence courses is presented in Figure 2.1. It provides a new look at an older distance learning technology. As with any educational or training endeavor, participants should check out the amount and the quality of the instruction being offered. Similarly, as every university does not provide the type of learning experience an individual may need, so every distance learning center does not offer the method of instruction, subject matter, or amount of interaction individual learners may need to learn through a correspondence course. The quality of correspondence courses, as any other type of course, varies. The resulting education often depends upon individual learners' initiative and ability to work well on their own. Learners who are highly motivated and need the flexibility of studying and practicing when it is convenient for them are best suited for correspondence courses.

2. AUDIO TELETRAINING AND AUDIOGRAPHICS

1) Audio Teletraining

Audio teletraining is one of the simplest forms of interactive distance learning. With audio teletraining the
learners can hear the instructor and the instructor can hear the learners in an interactive environment. This is done through the use of a device called a convener.

A convener is similar in many ways to a speaker phone. It plugs into a standard telephone wall jack, has a built-in keypad for dialing, and has a speaker that allows all learners to hear the instructor and the learners at other sites. A number of microphones can attach to a single convener, and most of these microphones come equipped with a push-to-talk button. With the push of this button, a learner is able to respond to an instructor's question or seek clarification. The convener and microphones allow many learners to interact directly with an instructor.

Audio teletraining is greatly enhanced with the distribution of prepared learner materials, such as print-based workbooks, videotapes, 35-mm slides, or other audiovisual aids. Instructors can refer learners
to these materials as they teach. Resident training courses that already have excellent learner materials are likely candidates for some of your first audio teletraining pilots.

At the beginning of a class, the learners and instructor use the convener to dial into an audio bridge. An audio bridge is a piece of equipment that creates a conference call among the instructor and the learners at all the sites. The audio bridge creates the virtual classroom of sound. Organizations can purchase their own audio bridge or can use bridging services from a number of companies.

The advantages of audio teletraining are that it is very inexpensive and easy to set up, and the equipment requires minimal instructor or learner training. The obvious disadvantage is that audio teletraining is not appropriate for training that requires the use of live motion video or where visual role modeling is important.

2) Audiographics

Audiographics take audio teletraining one step further. In addition to learners and the instructor being able to interact in a so-called audio classroom, they are able to share computer-generated graphics and slides. Audiographics training requires that the instructor and learner sites have the equipment needed for audio teletraining as well as a personal computer (PC), audiographics software, a special modem, and an interaction tablet.

The personal computer, software, and interaction tablet allow the learners and instructor to create graphics and share them with each site. The interaction tablet performs many of the same functions as a computer mouse, allowing the user to select menu items as well as annotating slides that are being displayed on screen.

The modem used in audiographics training is similar to modems that are commonly sold with PCs. It allows the graphics to be transmitted from the PC over phone lines to the audio bridge and from the audio bridge to the other PCs. Unlike other PCs, the graphics modem allows both the computer graphics and the voice of the instructor or learner to be transmitted simultaneously over the same phone line.

A class that uses audiographics is initiated the same way as an audio teletraining class. The learners and instructor use the convener to dial into the audio bridge. The instructor then uses the interaction tablet to control what the learners at remote sites are seeing on their PC monitors.

The advantages of audiographics are that they are relatively inexpensive and easy to set up and that
they require moderate training for an instructor and minimal training for learners. They also enable learners and the instructor to share graphics and charts in a real-time environment. The disadvantage is that like audio teletraining, it is not appropriate for training that requires the use of live motion video or where visual role modeling is important.

3. INTERACTIVE TELEVISION

Interactive television is the most widely used distance learning technology when the training audience is dispersed over a large geographic area and when live motion video is required. It is sometimes called business television or video teletraining. The learners can both see and hear the instructor by watching a television monitor. It is different from static television in that the instructor receives immediate feedback from the learners either from an audio system (it is the same system as audio teletraining), keypad viewer response system, telephone, fax, or a combination of the above.

The keypad viewer response system is a device about the size of a desktop calculator. Usually a keypad is at each learner’s desk. The keypad has alphanumeric keys that allow each learner to input information that is then transmitted to the instructor site. At the beginning of each class, for example, learners usually use the keypad to input their identification number or their name. Some viewer response pads also have a built-in microphone, which consolidates the convener and the viewer response pad.

The instructor has a console that displays the names of the learners and their responses to questions. For example, the instructor might ask a multiple choice question, and the learners would use the keypads to respond. The instructor can then view either the overall response (how many answered A, how many B, and so on) or the individual responses. The console also provides a visual cue to the instructor when a learner presses the call button to ask a question. (A little icon with a raised hand appears on his screen.)

So, you have the learners watching television at a number of geographically separated classrooms located throughout your area of training responsibility. They have a push-to-talk microphone and a keypad viewer response system in front of them. The instructor asks a question and then adjust the instruction to the levels of comprehension the learners demonstrated by the responses level of comp they provide with their viewer response keypads.
The advantages of interactive television include the ability to transmit the training to a large number of sites at one time, high-quality video and audio signals, cost-efficiencies when dealing with a large number of sites, and the ability to use many of the distance learning facilities that are capable of receiving interactive television events. The disadvantages are the cost of the equipment necessary to uplink the signal, the complexity of the uplink equipment, and the training required at remote sites to ensure quality reception of the signal and quality return audio.

4. TELECONFERENCES AND DESKTOP VIDEOCONFERENCES

1) Teleconferences

Teleconferencing is important not only in business communication and in-house or consortium meetings, but also for education in general. Many universities, colleges, and high schools, for example, use teleconferencing to link classrooms at great distances or to connect classrooms with businesses or organizations. One educator can reach many more learners at one time and the participants at every site can hear, see, and discuss, just as they would face-to-face. Cameras within the educator's room can zoom in to provide close-ups of a demonstration, for example, and transparencies, handouts, photographs, and other visual information can be highlighted on a TV screen.

Teleconferencing allows educators and trainers to present information shown on television screens in a remote location, so that participants can see what's taking place at the site originating the transmission and interact with people at the originating and linked sites. Broadcasts like this are the most common form of teleconferencing today, but software and hardware have made desktop conferencing possible and increasingly more affordable and user-friendly.

2) Desktop videoconferencing

Desktop videoconferencing can link participants working at stand-alone computers to see and hear each other. Because individual computers are used, each unit must be equipped with a camera to show who's working at that computer. In addition, depending upon the software and hardware used for the videocon
ference, participants may be able to send e-mail to each other during the videoconference and share online documents.

Learners may use desktop videoconferencing from their home or office; they don't have to travel to a predetermined site to participate in the teleconference, which can certainly be a benefit. The quality of desktop videoconferencing depends on the type of equipment and software used; low-end technology may not give participants the quality they would like or that a teleconference can provide. However, the costs of teleconferencing may place it out of reach for individual learners or small businesses and academic institutions.

Videoconferencing has been used for several years instead of face-to-face meetings, primarily among a small number of sites. However, it now has become one of the more common methods of training at a distance as well. The learners can see and hear the instructor, and the instructor can see and hear the learners. It is sometimes referred to as "two way, two way," referring to the two-way transmission of both an audio and a video signal.

With videoconferencing, the equipment is often the same at both the instructor or source site and the learner or remote sites. This provides the flexibility for any of the sites within the system to become an instructor site. Let's look at some of the equipment typically found within a videoconferencing classroom.

Cameras at each site capture what the instructor or learners are doing. There are usually three cameras: one oriented toward where an instructor would sit, a second overhead camera directed where the instructor would put visual aids (paper slides or three dimensional objects), and a third camera pointed where the learners sit. The cameras can be controlled by those physically at the site or by someone at one of the remote sites. An instructor may choose to limit the remote site control of cameras to only certain preset views.

A remote control, similar to that for a TV or VCR, allows an instructor or learner to choose which camera is displayed as well as the camera's angle or zoom control. A number of other devices are also available to control cameras automatically. One device causes the camera to automatically zoom in on whoever is talking. Another device, the wand device, can be easily handed from one individual to another and causes the camera to zoom in on the person holding it.

A camera's video signal is fed to the "brains" of the site, an electronic box called a codec, short for coder/decoder. The codec takes that signal along with the audio signal from classroom microphones and
changes them to digital information. All that means is that instead of a signal that our TV sets would understand, the video and audio signals are changed to Is and Os that represent the sights and sounds of the classroom. This information is then sent, usually over high-capacity phone lines, to the remote sites. After they have received the digital information, the codec at those sites converts the digital signal back to a signal that can be displayed on a television monitor.

Two large television monitors allow people at the sites to see both what the cameras at their own site (outgoing video) are seeing and what the cameras at the remote site (incoming video) are seeing. Other audiovisual sources can also be linked into the codec. Most sites are equipped with a VCR so that a videotape can be viewed and the signal transmitted to the other sites. A special type of 35-mm slide projector commonly used at video teleconference sites displays slides as video signals that are fed into the codec and not as images that go through a lens to a wall or screen. This technology allows the use of existing archives of 35-mm slides during an instruction or training period.

A touch-screen control panel to control the various audiovisual components at the source site is often used with videoconferencing as well. It enables the instructor to switch easily among different audiovisual devices and cameras without having to juggle an armful of remote controls.

The advantages of videoconferencing are that learners and instructors can see each other and that any site in the system may be an instructor origination site. The disadvantages include the high costs for establishing the required transmission lines and equipment.

In both teleconferencing and desktop videoconferencing, individuals or groups of learners can be linked to a discussion and see the presentation of educational or training materials in real time. Teleconferences can provide instruction to individuals or several groups of learners at one time; videoconferencing can link individuals (with limits as to the number of participants who can be linked at one time).

When teleconferencing or desktop videoconferencing is used in distance learning, the course may be highly structured, so that participants meet at a specified time and location. A whole course may be conducted through teleconferences or videoconferences. In addition, periodic use of teleconferencing or videoconferencing can enhance a correspondence course or other form of distance learning.

Teleconferencing and videoconferencing can be used to offer the best of on-site education or training and independent study. For example, learners may work on their own to master concepts and complete assignments, but periodically they can discuss topics, ask questions, view demonstrations, and otherwise
participate with a group. Thus, learners work alone at their own pace for much of the course, but they also become part of a group of learners taking a course at the same time.

5. COMPUTER CONFERENCING AND TRAINING VIA THE INTERNET AND INTRANETS

The Internet and intranets provide ways for organizations to create an electronic campus that the learner can navigate to interact with other learners, instructors, reference materials, and training sessions. Rather than using tennis shoes, the learner uses his PC to move from one site to another. Unlike the university campus, which is limited to a collection of buildings at one location, the electronic campus may have resources separated by thousands of miles.

A little background might be helpful as you consider whether your organization might use the Internet or an intranet to deliver training. The Internet began in 1969 as a U.S. Department of Defense experiment connecting four computers to test communication capabilities between computer networks. Since that time, it has grown to more than a million computers linked worldwide.

Up until just a few short years ago, accessing information from other computers on the Internet was not a user-friendly process. Although important information was available, it took a high degree of computer and network literacy to know how to get it. With the establishment of the World Wide Web and browser software, the doors to the Internet were suddenly flung open to all who wanted to travel its reaches.

The browser software replaced complicated text commands with, easy to use screens that allowed users to point and click their way to the information they wanted. Browsers also allowed users to view photos, graphs, crude quality video, and even sound over the Internet. Information that was previously hidden as computer files with hard to understand names became accessible as Web pages. These pages are graphical documents that display the requested information in an easy-to-read format. Figure 10 on the next page is an example of a Web page as it would appear on a PC screen.

Organizations soon found that they could use the same software and the same computer setup that was working on the Internet and create a network of computers called an Intranet that was accessible only to their authorized employees. The primary use initially was to share information such as project reports policy manuals, and company databases.

An important difference between an Intranet and the Internet is each one's reach. The Internet has a
worldwide scope and can be traveled by anyone having access through a PC and a connection to the Internet. The computers connected to it are intended to be used by external organizations and individuals. The Intranets are usually intended for a restricted audience—those who have authorized access, usually the employees of the organization that owns the intranet. The Intranet may be connected to the larger Internet so that employees can have access to information from the Internet. However, a firewall, or computer security system, prevents external organizations or individuals from accessing the Intranet.

It did not take long before educators and trainers began to use the Internet and Intranets for instruction and training purposes. Some of the tools that the Internet and Intranet made available to trainers include the following:

- Bulletin Board Discussions

Learners and instructors ask a question or make a remark by posting an e-mail message to a bulletin board in much the same way that they would pin a note on a cork board. Everyone in the class can see the message and respond or comment if they feel so inclined.

- Direct E-mail Communication

Learners send e-mail to the instructor or another learner individually to seek assistance or comment on some aspect of the training.

- Online Course and Reference Materials

Rather than distribute paper copies of course texts, practical exercises, case studies, or other reference materials, the trainer posts the documents to the Net (abbreviation for both the Internet and intranet), and learners can access them directly. Of course, learners can always print out a hard copy if they prefer.

- Live Computer Conferencing

An instructor can set up a live conference room or chat room for all the class members to log into at the
same time. Anything a learner types on his or her PC is displayed on the screen for all to see along with that learner’s name. This type of conference could become a mixture of disconnected sentences and thoughts if uncontrolled. Protocols are established to facilitate the orderly flow of discussion. The discussion text can also be stored so that participants can later review it.

At the present time, print, graphs, and still photos can be distributed over the internet or Intranet rather easily. Video and sound are not easily distributed. The amount of information that has to travel to deliver a high-quality 60-second video clip chokes the capacity of the computer network and ends up looking like an early Charlie Chaplin film. Rapid advances are being made in this area however and may soon allow trainers to use the Nets for transmission of training video as well. Your organization or company may already have an established local area network (LAN) or wide area network(WAN) that connects the various computers and PCs. In addition to that, what is needed to use this existing asset for training purposes? The instructor and each learner will need to have access to a PC that has an Internet or Intranet connection. The PC will need to have Web browser software installed. Of course, you will want to provide training to the personnel on the software. One of the advantages of using the Internet or Intranet is that once you have trained personnel on the use of the browser, that same software can be used to participate in and access several different training courses. Those readers without an organizational network can turn to a commercial provider for these services. Several online services provide space on dial-in computer networks as well as the necessary development expertise if needed.

You will also need someone to prepare the Web pages and maintain the electronic training site. This person is often referred to as the Webmaster. The same browser software that allows your learners to view the Internet or Intranet can be used to publish the Web pages that contain the course texts and varied reference material. Depending on your organization, you may choose to have someone receive the appropriate training to do this, or you may contract or outsource the creation of these Web pages. Training courses that are largely text-based or self-paced are ideal candidates for delivery via the Internet or intranet.

Advantages of Internet- and Intranet-based training are that learners can access the materials from anywhere as long as they have Internet or Intranet connectivity. The cost of training delivery is already covered by the existing infrastructure required to establish the computer network. Materials can be easily modified or updated, and once users are trained with browser software, they can use the same software for various courses. Disadvantages of Internet- and intranet-based training include the level of expertise need-
ed to create training Web sites, limitations on transmission of video or sound, and security measures needed to prevent external use of a training site.
III. THE WORLD WIDE WEB IN EDUCATION AND TRAINING

The World Wide Web (WWW, Web) has become one of the most popular methods of disseminating distance learning programs. In fact, if learners and educators/trainers don't need face-to-face communication during the course, it is one of the best methods of providing information for learners.

Information stored on a Web site can include hypermedia (such as video clips, animation, sound effects, music, voice-over, photographs, drawings, and documents), hypertext (documents and static [non-moving] graphics), and unlinked text or graphics. The prefix hyper simply means that the information has been designed to link that chunk of information with a related chunk of information. The benefit of the Web is the use of hypertext and hypermedia to link plain documents or multimedia information.

More learners have access at home or in the office to the Web, as well as other parts of the Internet. Although the basic coursework might be completed by using information and resources linked through the Web, many educators/trainers who use the Web as an educational tool also assume that learners have access to e-mail, mailing lists, bulletin boards, and other Internet services. Therefore, other Internet-related activities are often an expected part of a Web-based course.

1. WEB-BASED INSTRUCTIONAL ACTIVITIES

For educators/trainers, a benefit of the Web is that the types of information that can be used in a course are almost limitless. Because the information is stored electronically, learners with access to the site can download or use online the information as long as it is stored there. That makes it easy for learners to work at their own pace and to visit the site as frequently as they like, whenever they have time. Some information can be stored at the site indefinitely, but other information can and should be updated frequently. Electronic storage makes it easier for educators/trainers to provide the information learners need throughout the course, as well as assignments, examinations, and samples that may be useful to have at the site only for a limited time.

Educators/trainers usually provide background information, such as a course syllabus, on the Web,
but cyberspace is also a good place for sample documents and simulations. Multimedia demonstrations and samples are two types of primary materials that educators/trainers may use to present basic information about the course's subject matter.

In addition to reading, seeing, hearing, and interacting with Web-based information, an instructional site can also help learners communicate with their instructor. Depending upon the type of hypertext links set up within the site, learners also may be able to send e-mail messages directly to the educator/ trainer, institution, or business through a mailto: link. Learners therefore don't have to wait until they enter their e-mail systems to discuss information they found on the Web site; they can ask questions, send comments, and request information while they work on the Web.

Because the course's Web site might link learners with related sites for additional information or activities, research and reinforcement activities can be easily developed in conjunction with the original Web site. Educators/trainers may link some sites they want learners to visit, as well as merely list other resources that learners may want to locate on their own.

Figure 3.1 Chunks from Rochester Institute of Technology Web site
http://www.distancelearning.rit.edu
2. CHUNKING INFORMATION

Educational information designed for the Web should be more than documents uploaded and linked electronically. Course content should be designed specifically to be used with an interactive, electronic medium that is capable of accommodating different types of audiovisual information.

When people read a hardcopy document, they generally read from the top to the bottom of the page. In U.S.-based culture, they read from the left to the right side of a line. Although they may skip from section to section, read the last chapter before the first, or use an index to locate information they want to read first, most people employ a linear approach to reading a document, reading from the front cover to the back.

However, users approach electronic, hyperlinked information very differently. They seldom read paragraph after paragraph and scroll through screen after screen of text and/or graphics. Instead, they prefer to scan a screen to find the bits of information that are most important to them. If the information takes too long to load, if the first screen lacks the information they want, or if the screen design doesn’t capture their attention and make them want to investigate the site further, they simply move to another site.

This scanning process may take fewer than five seconds, but Web users are notoriously impatient. They like to find information quickly; they want the links to work; and if they’re frequent Web users, they know what’s trendy as well as functional in page and screen design. When you design information for the Web, you need to make the site both attractive and usable, and you need to break down information into usable pieces that people can find quickly.

A basic principle in designing information for the Web is chunking. A chunk, or the smallest piece of information that makes sense by itself, is a manageable amount of information. It might be an icon or a symbol, a paragraph, a menu, a photograph-whatever has independent meaning without needing a further context.

Each chunk of information then must be arranged on a screen in whatever order will be most useful for learners. The course designer must decide which chunks should fit on the home page, or first viewing screen, and which chunks should be located elsewhere but linked to chunks on the home page.

This partitioning of information into manageable units and linking the chunks to form meaningful units is the structure of the Web. Educators and trainers who design information for a Web course must
break their material into chunks, link the chunks to form a comprehensive and easily usable web of information, and ensure that the chunks provide information in the appropriate textual or visual formats for the type of information being conveyed.

When learners work with course materials on the Web, they must be able to do the following:

- Easily move among chunks, both within a single Web site and among Web sites
- Browse through the information, by scrolling or through links (including buttons, menus, hypertext links, and icons)
- See the relationship of chunks and not get lost in cyberspace (for example, by using a directory, table of contents, list of links)
- Upload and/or download information
- Understand where information is located and how to work with the information (i.e., a transparent interface)

The ease with which learners use information stored on the Web isn't entirely in the hands of course designers, however. Different browsers (for example, Netscape, Mosaic) make working with the Web easier or more difficult. Some browsers accommodate text-only, whereas others can load text and static or moving graphics. Some browsers have the capability of handling highly interactive graphics and all types of sound (e.g., music, voice-over, sound effects), but the user's computer may not have the software, cards, or memory to present the information on screen. Even if the computer can handle the amount and type of information and the browser supports the types of information that can be downloaded from the Web site, the computer's processing speed or memory allocation may make downloading some information a very lengthy process. That's why many users give up during a long wait, preferring to go to another site and see less technically sophisticated but faster loading information.

If learners are working in a location that's been wired to the backbone of a computer network, they don't need a modem to make an Internet connection; also, the information-loading times may be much faster than if they use a modem from a remote location. Learners who work at home or in an office away from a network may need a modem that can receive and transmit the type of information required in the course.

III. The World Wide Web in Education and Training
Course designers may need to tell learners exactly what type of browser, hardware, or software will be needed to use all the information stored in the site or at sites learners will be required to visit during the course. Educators/trainers should explain, sometimes in great detail, how learners can connect their computer with the Internet and locate the course's Web site.

Educators/trainers may not have the control they'd like over learners' computer systems and Web capabilities, but they can do a great deal to ensure a Web site's usability. By carefully designing materials for the Web that the majority of learners can find and load quickly and easily and by updating the site regularly, they can help ensure that learners will have the amount and types of information they need to complete the course.

The following sections from the home page of the Rochester Institute of Technology's Distance Learning illustrate the principles of chunking. Figure 3.1 shows the breakdown of primary chunks of information; this section is located at the left of the home page.

Each link is a separate chunk of information, arranged in a specified order. A list of additional links, upper-middle of the page, provides potential learners with the option of finding more general information about the University (Figure 3.2). At the bottom of the page, learners see other important information that stands alone and is not linked hypertext.

Each chunk of information can stand alone, either as a link to other, related chunks of information, or as a separate piece of information that has meaning on its own. The page is arranged so that learners can first understand the hierarchy of information to be presented at the site, then can choose from a series of links. If learners choose to keep scanning the page instead of moving to another site, they can select links to learn more about the University in general, or, if they continue to scan the page, can find other
(non-electronic) ways to receive more information about the University or the program in which they're interested. The page is easy to read, functional, and chunked for easy access to different types of information.

3. BASIC QUESTIONS FOR DEVELOPING A WEB-BASED COURSE

Learners can therefore visit the site whenever they choose, use as many or as few links as they deem necessary, work with the information in the order of their choosing, and go back over information as little or as many times as they need to master the subject. The information will be designed to meet the needs of many different learners, so that some information will be more visual (e.g., static or non-moving graphics like photographs and drawings or moving graphics like video clips), aural (e.g., sound clips, music, special effects), or textual (e.g., sample documents, descriptions, definitions).

You've determined that learners will need to interact with the information and you've planned how much or how little interaction will be required. For example, you might create an interactive quiz section in which learners can read a question, choose an answer, and have that answer locked in. You might then receive the completed quiz from the learner, so you can comment on it more personally, through e-mail perhaps, or you might allow immediate electronic feedback about the learner's response to each question. In short, you've analyzed the need for a Web-based course and you're confident that this type of distance learning is appropriate.

Now you need to work as part of a team consisting of technicians, who will help set up, maintain, and update the site (as well as work with the server and other computer resources); educators or trainers, who will develop course materials and work with learners; and administrators or executives, who usually oversee the projects in general and allocate funding and resources. As you plan the course, you should agree to the answers to the following administrative and course-design questions.

COURSE-DESIGN QUESTIONS

Every time a course will be offered on the Web, the designers (probably the educators/trainers who will be leading the course) should answer the following list of questions. The Web site’s design should be useful
and attractive, which means that the screens "look" should be updated regularly. Because learners' needs change and some subject areas revolve around new or changing information, the online course materials should be modified to keep the course current, interesting, and accurate. The following course-design questions should help you develop a new online course or update a previously offered one.

1) What Types of Materials Will Be Included on This Web Site?

Most course designers provide background information about the course, provide links to assignments and sample documents, and provide graphics and/or sound to supplement the information contained in texts. In some courses, simulations, interactive quizzes and tests, and e-mail correspondence are appropriate. You need to decide which types of materials can best present the subject matter and meet the diverse learning styles of your audience.

2) How Should the Materials Be Linked?

You might work only with internal links, so that one hypertext link leads to information located within your Web site. For example, you might have a link from a table of contents to each lesson's core text; from a document to further illustrations, examples, or definitions; or from a test item to the reference materials on which the test item is based.

Although these internal links probably will be numerous and will help learners move from basic information about the course to more specific lesson- or activity-related items, external links to other sites are also useful in most courses. External links might refer learners to other Web sites affiliated with your business or institution, such as a campus register, a course catalog, library resources, or in-house departments. Other, external links might help learners find information about topics related to the course. Links to the Web sites of professional associations, non-profit organizations, community resources, libraries, and online databases or documents are also common.

Not only do you need to plan how many internal and external links are appropriate, but you should also carefully design the type of link that will make the connection. Hypertext links may involve a word or phrase that links learners with related chunks of information. It's helpful to learners if the textual link changes color once they have used that link, although the link can be reused many times. This color refer-
ence helps learners remember which links they've used. If you don't determine the sequence in which links should or must be used in the course, learners can choose to use the information in any order they like. Designing links to change color helps learners chart their progress through the materials.

You might decide to supplement hypertext links within the Web site with hypermedia links, so that learners click on an icon or a graphic to follow the link to related chunks of information. Each graphic should be an intuitive link, so that learners know at a glance that the graphics can be used as clickable links, as well as underlined text items. Usually, you'll want more than one link to lead to the same information; having a graphic and a textual link to the same chunk is a good idea.

Additionally, some navigational links might be duplicated on a pull-down, pull-over, or pop-up menu or on buttons placed along a margin or within a graphic. The most important links, such as those to the home page or to key concepts or main areas of the Web site, are often repeated in different forms and places on a screen.

Other links, like a mailto: link, allow learners to send information, instead of leaping to a new chunk they passively read or view. If it's important for learners to send their questions or comments to you while they're working with the Web site, you should use a mailto: link. If you want people browsing the home page to request registration information or otherwise contact you to express their interest in your course, you should include a mailto: link at least on the home page, although it's a good idea to have a mailto: link at the bottom of each linked screen within the Web site. Most often the mailto: link is placed close to a copyright notice and/or a company's or an institutions identifying information.

If you're designing information that will be used with learners in public settings, or in other environments where learners may not have access to a mouse or a keyboard, you might need to make the links operate by a touch to the screen, instead of a keystroke or a point-and-click of a mouse. Kiosks in public settings, such as community information centers, malls, libraries, or even lobbies of businesses, for example, can provide information about your business or institution. Providing information about training or educational opportunities can be a good marketing tool, so that people who might not know about your distance learning courses can begin to associate your company's or institutions name with distance learning opportunities. Information on a kiosk usually is called up on-screen when someone touches a button or icon, but the structure and types of information you want to include on a general information kiosk are the same as those for your screen design of a Web site.

However you link information, whether on a Web site or through an intranet via kiosk, the interface
should be transparent, so that learners intuitively know what a link looks like and how it can be used to connect chunks. At least two navigational tools (e.g., text, graphic) should be used to link the most important chunks of information.

3) How Often Should the Materials Be Updated?

Some subjects change very little; for example, fundamentals of many academic subjects, from biology to history to discourse, can be presented in the same way in course after course. As approaches to teaching the subject matter change, the course needs to be updated; as new information becomes available, it should be added to the existing body of knowledge about that subject.

If your subject matter changes very little, you may be able to refer learners to the same core documents for a long time. However, to keep the course fresh and to meet the needs of different learners over time (as well as the changing expectations for a Web site and the demands of technology), you still should alter the materials periodically. You might redesign the information, add new samples, include more graphics, make online activities more interactive, and so on-to keep the course fresh.

On the other hand, some subject matter changes dramatically within a short time, such as that dealing with research and theory. If new advances in technology and science, for example, advance professionals' knowledge of the subject, you may need to update your materials daily, weekly, or at least before the course is offered again.

No matter how quickly or slowly the subject matter changes, learners who work with a Web site always like variety. They usually browse among many Web sites throughout a day or week, and they're aware of trends and technical advances in Web sites and site designs. To keep your course interesting and innovative, you need to update the "look" of the site, even if the basic information you need to present changes little. You should check not only other popular Web sites in general, but also sites providing information about the course's subject matter, to see how information about your subject matter is being presented at other sites.

If your course will be offered indefinitely and is unstructured, so that learners can begin to use the information at any time and have few or no restrictions on the length of time to complete the course, you may plan to update materials at specific intervals, such as every week on Friday. If the information will change on a regular schedule, you need to let learners know when new information will be available.
Updating information must become a regular activity in presenting a course on the Web. The frequency with which you update information depends on the subject matter, the speed with which technology advances, learners' specific needs, and learners' expectations for the site. As a course designer, very practically, the number of times you update the information may depend on your schedule.

4) How Will Learners Work with the Information on This Web Site?

Depending upon your previous analysis of learners who are currently taking and who may take your course someday, you have a good idea about the ways your target audiences prefer or are required to receive information and meet course requirements. You now need to determine how learners will work with the information as they take the course.

- Will they read documents?
- Will they view examples?
- Will the examples require graphics?
- Will the graphics be non-moving or moving?
- Will they interact with examples and manipulate them?
- Will they take interactive quizzes and tests?
- Will they send e-mail directly to you from the Web site, perhaps as they have questions or comments?

These and similar questions help you determine what type of browser, computer system, and type of interaction learners will be required to use to complete course activities.

The more interactive you can make the site, the easier learners will understand the course content. Even a text, which can be read passively, can be linked to more interactive assignments or activities to follow the reading. Interactive review questions with programmed responses, mailto: comments, and research or practice activities related to the text learners have just read are a few ways to increase learner interaction with the subject matter. Although reading text is still an important way to gather information — and some documents certainly will be part of every course — many learners prefer to gather information in other ways. They may want to view a video, for example, which provides information in a differ-
ent format. However, "viewing a video" is also a passive activity, even though it may require more visual involvement than reading. At the conclusion of the video segment, you should link activities that require learners to respond to what they've seen. Make learners do something — write an e-mail message, complete an assignment, discuss the information within a MUD, participate in a videoconference to ask questions or summarize what they've learned, or complete a simulation to apply their knowledge. When you design a Web site, you must include several ways to make learners interact with the information.

When you find ways for learners to respond to the information, such as writing an answer, asking questions, making decisions, or completing a task, you reinforce their learning. Learners who take an online first aid course, for example, might learn a great deal from reading about correct procedures and even seeing graphic examples. However, an even more effective follow-up activity to this basic presentation might involve a simulation, in which a learner must decide on a type of treatment, then act out giving that treatment.

The system might be designed to illustrate the probable results of the learner's decisions and provide feedback about the learner's effectiveness in solving the medical problem. Of course, not all courses require this type of interaction. However, you must make the site as interactive and innovative as possible to ensure that learners gain not only knowledge, but experience.

5) What Other Types of Communication with Learners Will Be Necessary?

The Web site is the primary location for information about and for the course. However, because the Web is part of the Internet, most learners also have access to other Internet services. In addition to requiring learners to work with the Web, you might ask them to send e-mail messages, subscribe to mailing lists, or participate in discussion groups, newsgroups, or MUDs. Outside the Internet, other methods of required communication might include surface mail, phone or voice mail, videoconferencing, or teleconferencing.

For example, although you regularly, communicate with learners through e-mail and online discussions, some documents may need to be mailed to you for a final evaluation. Even if the primary method of gathering information is through the Web site, learners may be required to participate in a teleconference once during the course.
4. QUESTIONS ABOUT WEB SITE DESIGN

To help you get started in designing a Web site, use the following series of questions every time you design a site and each screen/page that is linked within it. Figure 3.3 can be used as a general checklist to help you plan your design.

**Purpose of the Site**
- Why will people visit this site?
- When will people visit this site?
- What do they need to know first?

**Purpose of the Page/Screen**
- Why will people visit this page?
- When will people visit this page?
- What do they need to know at this time?

**Content**
- How much information will be provided about the subject matter?
- How much information will be navigational?
- How much information will be instructive?
- How much information must be on the home page?
- How much information must be available on the site?
- Should the information be accessible only as text?
- Should the information be accessible only as graphics?
- If both graphics and text are used, what should be graphics, and what should be in prose?
- How should the information be organized for clarity of meaning?

**Frequency of Update**
- How quickly will the information be outdated?
- How much information will become outdated?
• How much information will remain constant?
• How often should the information be updated?
• How easy is it to update this information?

Links
• To what addresses should this information be linked?
• How will people find this site?
• How much information should be linked within this site
  (e.g., how many internal links are needed)?
• How much information should be linked outside this site
  (e.g., how many external links are needed)?
• What types of links are appropriate?
• How many types of links (e.g. hypertext, menu item, icon) should be available
  for the same information?
• How can links be made 'intuitive,' so that learners immediately understand
  how to use them?
• Do the links work?
• How often should the links be checked to ensure their continuing accuracy?

Design
• What should be the overall impression of the first screen
  (e.g. trendy, scientific, businesslike)?
• How much information must appear on the screen at one time?
  (Remember that you have no control over the learners' browser and the preferences set,
  therefore, the amount of information on a single screen may vary depending on the defaults
  that the learners set.)
• Which types of information should be provided?
• How can individual chunks of information be arranged for effective organization and
  for pleasing appearance?
• What effect should be created?
- How many different types of media will be used in the design?
  Which colors will accent the design?
- What sounds should be used?
- Which pictures will best illustrate the message? What music should be used?
- Is the overall design functional and attractive?
- Is the overall design well suited to an interactive electronic medium?
- How often should the design be updated?

Figure 3.3 Design questions about your Website.

A good way to study Web sites' designs is to browse the Web regularly. Keep track of the sites that are particularly appealing and designs that are appropriate for the type of course you're providing. Look at the "best" and "worst of the Web" lists and see what makes certain sites popular and other sites laughable. Look at the HTML source codes of the sites that interest you most; see which color combinations and types of links seem most effective. Then you can incorporate the best designs into your Web site.

You also should practice working with HTML. By using one of the many commercial or shareware HTML editors or code generators, you can design a Web page without having to know much about HTML. Of course, you can always type in HTML codes in a plain text document, if you don't have access to HTML software. Although software is making it easier to create Web sites, the more you know about HTML and other software, such as Java, for example, the easier it is to create more innovative designs and learn from viewing the HTML source documents of the sites you find most effective.

Once you've designed your basic home page and a few related screens, look at the design critically with one or more browsers, and encourage feedback from your peers. Create a few of these trial designs before you launch your Web site, just to make sure the links and design work the way you want them to work and that you have the best design possible when you first introduce your course.

The best measure of your Web pages' success is your learners' evaluation. Throughout the course, ask learners to evaluate the site's usability and design. Let learners know that you sincerely want to make the site better and discuss ways to make the information more effective.
IV. E-MAIL, FAXMAIL, AND VOICE MAIL AS DISTANCE LEARNING TOOLS

Several communication tools, including e-mail, faxmail, and voice mail, help bridge the communication gap in distance learning courses. Although each tool can be used as the primary means of disseminating information in a distance learning course, each is better suited to supplementing other instructional tools. Sending messages electronically is an important component of any distance learning course; use of e-mail, faxmail, and/or voice mail creates a more personal educational or training atmosphere. It makes communication possible at any time, and allows the one-to-one communication not always possible in other distance learning technologies (e.g., through Web materials, via broadcast).

Electronic mail (e-mail) is one of the simplest, yet most effective communication tools; of the three tools discussed in this chapter, it's the only one around which an entire distance learning course can be based. Similar to the way familiar correspondence courses using surface mail operate, e-mailed course materials and correspondence with educators can be sent to individuals who enroll in a course. But e-mail offers a faster method of communication and also serves as a link to more than just one person at a time. These two factors make it more desirable than surface mail for correspondence courses.

Faxmail is a newer tool that combines the best of e-mail and taxed communication. Although it's not in common use now, some universities (e.g., University of Phoenix) have incorporated faxmail into their distance learning technologies. Future courses may be built around this communication medium.

Voice mail has even been used as a primary method of sending and receiving information in some distance learning courses, but telephone calls, much less voice mail messages, are seldom ideal for the complexities of running most distance learning courses. Voice mail, however, is a good supplement, because it allows a more personal communication. Although e-mail messages may be more elaborate and allow documents to be attached to the messages, voice mail lets learners and educators/trainers hear each other. The nuances of spoken language come across more clearly in voice mail messages, unlike e-mail or faxmail.

These three tools can enhance other forms of distance learning; educators/trainers should consider how one or all can be incorporated into their distance learning programs.
1. NETWORKS AND E-MAIL

E-mail is a flexible tool, because it can be used in-house to connect people via intranets or it can send messages across the Internet. E-mail can be sent to users though a local-area network (LAN), such as a network linking all company employees or students within a university. A network limited among users within a geographic area, such as a town, may even be considered a LAN, and the learners within a geographic region can participate in distance learning courses with local institutions or businesses.

An intranet is an internal or in-house network designed for use within a company or an institution. In-house correspondence and announcements of upcoming distance learning courses may be sent through the intranet. Most companies are creating intranets to link employees' workstations electronically and enhance in-house communication. Training is only one area to benefit from intranets. Not only can e-mail be used to send messages to all employees about upcoming training opportunities, but also individual messages can be directed to employees taking a course. Taking an in-house, e-mail-based course can be an efficient way to complete a company's training requirements, because employees can send and respond to e-mail whenever they have a break in the work day. They don't have to leave their workstation to attend a training session or travel to another location for days at a time. Intranets can make in-house training more efficient for trainers and learners, and more cost effective for supervisors.

The most popular network, the Internet, goes beyond the limitations of a LAN, as users can converse with anyone who is connected to this largest of all wide-area networks (WANs). E-mail sent through the Internet might be directed from one user to another, but it also might involve messages to and from mailing lists and bulletin boards. Many Web sites include hypertext links to a company's or an individual's e-mail; these mailto: links and e-mail by hypertext links allow users to send e-mail while they browse a Web site. E-mail along the Internet can enhance distance learning programs as well as serve as a primary means of communication among learners, educators/trainers, and the institution or company offering the course.

Although e-mail systems can be quite advanced, allowing users to attach text and graphics or serving as a secondary tool during videoconferences, even the simplest, plain-text systems offer educational advantages. Because e-mail can be sent from one person directly to another, or to a group simultaneously, it creates a network of users who can discuss their ideas, share information, and evaluate documents, for example.
Some educators/trainers rely on e-mail as a primary means of transmitting course information. Distance learning courses can be structured around e-mail as the only method of disseminating information. More often, however, e-mail supplements other types of instruction. In addition to simple e-mail messages, mailing lists, discussion groups, and multiple-user domains (or dimensions), known as MUDS, also facilitate learning.

E-mail can be used in conjunction with desktop videoconferences during a conference session as well as sent separately outside conference times. During a videoconference or in a MUD, several people may converse by keying in information that the group can see and respond to at the same time. However, e-mail is often used because it's perceived as a more personal, immediate, and private form of communication, similar to a letter, memorandum, or voice-mail message.

Educators and trainers use e-mail more flexibly than any other electronic distance learning technology. Most computer users are familiar with e-mail and it is inexpensive and more widely available than other electronic distance learning tools. These reasons make e-mail an increasingly common part of education in general and distance learning in particular.

E-mail is becoming increasingly important in a traditional classroom or even within an in-house training program. Other instructional methods might be very traditional. The educator or trainer may provide in-person instruction to a group within a traditional lab, classroom, or boardroom. Learners usually work with traditional paper-based materials, like books, articles, and other primary documents, as well as electronic media, such as Web-based information, multimedia presentations, and hands-on demonstrations.

But e-mail adds another dimension to the way that educators and learners interact. It provides more opportunities for "conversation" outside the traditional classroom and it encourages learning to take place any time, any place. Because e-mail can be sent at any time, it's an ideal way for learners and educators who don't work typical 9-to-5 days.

Employees may not have time to concentrate on the information they gained in a seminar or a training session until several hours after they get home or can take a break on the job. They may think they understood everything until they try to complete a job task and need to clarify some information. As they think about what they've learned, they may have ideas to share with the trainer and the group or they may want to ask more questions so they can learn even more about a topic. These situations probably don't...
occur when the educator and learner can meet face-to-face, and the learner may not be able to wait until the next official session to ask a question, make a comment, or suggest a solution. E-mail helps learners capture the moment when they need to "talk" to the educator, but he or she is unavailable personally.

In the same way, educators may receive several messages from learners who sent messages at 3:00 A.M., or who periodically had questions throughout the day. Late at night, early in the morning, on a brief-break, or at a regularly scheduled correspondence time, educators can sit down to read through messages, prioritize them, and respond to learners, individually or as a group. A phone call, an in-person visit, or discussions before, during, or just after a training session or class meeting might not be convenient ways for the educator to provide learners with the information, or the personal attention, they may need. E-mail lets educators take as little or as long as they need to meet learners' needs, but it allows this communication to take place at the educator's convenience.

Although convenience of writing and responding to e-mail all at one time and the possibility of sending e-mail at any time can certainly be benefits, e-mail also has some other advantages. It can encourage more communication among participants in a course. For example, it encourages many learners to ask questions, request clarification, receive additional assistance, and present progress reports. Some people are simply shy in a group setting; they don't like to ask questions, or they may feel intimidated by other learners or even the subject matter. Somehow a question sent via e-mail doesn't seem as potentially "stupid" as a learner may feel it might sound in person.

Because e-mail tends to be sent quickly and spontaneously, and the messages usually are short and direct, learners send more messages-whenever they need to communicate with the educator or trainer. Educators, too, are encouraged to write more often. They may not want to single out one person for additional guidance or correction, but with a personal e-mail message, they can spend more time, and give more direction, to people who need their assistance. That, in turn, encourages learners to request more assistance, because no one else in the group has to know that they wanted, or needed, additional help.

E-mail also allows more interpersonal dialogue between learners or learners and educators. Discussions within a course are usually limited by the amount of work that needs to be completed in a session and the time constraints of a single session. E-mail expands the time for discussion, because participants can take the discussion off-line and write directly to each other, as often or as little as needed to finish the conversation.

E-mail is a practical way to transfer more formal information, too. For example, it's easy to send
notices about upcoming quizzes or evaluations to the group or to individuals. Reminder notices, descriptions of assignments, and basic course information like schedules, reading lists, and objectives can be mailed, and assignments, drafts of documents, progress reports, and other course-based materials learners are required to complete can be returned to educators electronically. Each person who receives the information can then decide to store the message for future reference, download the information to disk or a printer, or simply delete it after reading the message.

E-mail as the primary means of communication in a distance learning course works similarly to e-mail used as only one method of transmitting and sharing information. Educators work with e-mail in the following ways as the foundation of a distance learning course.

2) COMMUNICATION WITH STUDENTS INDIVIDUALLY

Individual responses to learner's questions and comments can be sent from the educator/trainer to the learner, without other learners "listening in" on the conversation. These messages are best suited to personal communication, such as evaluations of the learner's performance or additional tutoring.

Frequent use of e-mail helps educators/trainers and learners build a personal relationship with each other which, in turn, encourages more frequent communication. Learners who feel comfortable using e-mail like the fact that they can disclose personal information or simply information they don't want other learners to know; they can ask questions they may not feel comfortable asking in a classroom or during a training session; they can discuss concerns and share ideas in greater detail than time might allow in a training or classroom session or during the breaks before or after the session.

Most e-mail systems automatically record when an e-mail message was sent, when it was received, when it was saved, and when or if the recipient responded to the message. Referring to saved messages, or even tracking whether you responded to a message, are easy tasks. Using e-mail can thus help educators/trainers keep track of how much time they're spending with each learner, what each message was about, and how they responded to the messages. This type of tracking can also help administrators when they compile records of educator/trainer-learner interaction and the effectiveness of using e-mail instead of or in addition to other communication tools.

3) COMMUNICATION WITH STUDENTS AS A GROUP
Group messages are an efficient way to share course assignments, announcements, and core materials. Longer texts and graphics can be attached to the message so that learners can download, save, or read the information once. E-mail can reach many people at the same time and can save paper resources. A course outline, for example, can be used and stored electronically, then it's up to the individual learner who received the outline through an e-mail message whether to download the information on paper.

2. BULLETIN BOARDS

Bulletin boards, by themselves, are not suitable for presenting content in a distance learning course, but they can provide supplementary information. A university's or an organization's electronic bulletin board can be the recognized site for posting announcements, changes in courses, announcements of new courses, registration deadlines and procedures, calendars, and information about other special events.

Many professional societies and associations maintain bulletin boards not only for members, but also for people with similar interests or potential interests. Educators may want to get a list of professional associations appropriate for their course's subject and help learners gain access to the associations' bulletin boards. The notices might lead learners to other sources of information and educational or training experiences that can supplement the instruction given in the course. And additional work with other electronic sources is also useful for learners who hope to understand more about increasing their knowledge through electronic sources of information.

USING BULLETIN BOARDS IN A DISTANCE LEARNING COURSE

If you're an educator or a trainer who wants learners to access bulletin boards, you can do the following:

1) Check with professional societies, companies, and organizations dealing with topics covered in or related to your course's content to learn if they have bulletin boards and how to access them.

2) At the beginning of the course, post guidelines for accessing the bulletin boards you want learners to check throughout the course.
3) In addition to the technical instructions for accessing bulletin boards, post information about protocol for posting and using notices.

4) State clearly how learners are required or simply encouraged to use information from bulletin boards as part of their course activities.

If you're an educator or a trainer who offers a distance learning course, you may also want to use bulletin boards in these ways:

1) Check with your institution or organization to learn about appropriate bulletin boards for your notices and how to post information. If you're a member of a professional association, you should check with the administrative or membership office to learn about your group's bulletin board and how it can be accessed. You may need to start a bulletin board for learners taking your course, with the approval and guidance of administrators or managers at your institution or company. You also may want to set up a distance learning bulletin board within your company or institution to keep everyone informed about your courses and upcoming educational or training sessions.

2) Develop notices that will stand out from all the others. Write a catchy title or phrase. Keep the description brief, but provide everything potential learners will need to become interested in the course and register for it. Use graphics, color, and hypertext links to attract favorable attention and to connect learners with sources of additional information.

3) Update notices frequently. Readers tire of old notices or electronic information that looks the same visit after visit. Take the time to craft the notices so that they inspire potential learners to find out more about your distance learning course. Delete outdated information.

3. MAILING LISTS

Like bulletin boards, mailing lists are not appropriate for transmitting the bulk of information for a distance learning course, but they are another good source of supplementary information. Mailing lists pro-
vide a forum for discussion groups. Anyone can join one or several mailing lists, and subscribers can post messages as often as they like. Mailing lists can be found for almost every interest area imaginable. For example, Figure 4.1 indicates the diversity of mailing lists.

To subscribe to a mailing list, address a message to the listserv, according to the address you've located for the mailing list to which you want to subscribe. Usually, instructions are provided, but in general a new subscriber types the listserv's address in the e-mail message's To line and skips the Subject line. In the body of the message, the following should be keyed in:

subscribe [your e-mail address]

Here is example:

subscribe shin@rit.edu

Within 24 hours, if the subscription has been noted and "approved" by the list-serv, the new subscriber receives information about the mailing list. Instructions for unsubscribing, or getting off the list, as well as for posting notices, responding to individuals and to the list, and following the list's protocol, are provided. Sometimes the listserv sends the FAQ for the list, which new users are encouraged to save for future reference. This introductory message should be saved, at least, it might be handy to print a copy.

Active mailing lists generate dozens, if not hundreds, of messages each day, so subscribers should be warned that messages can pile up very quickly. People who don't access their e-mail often, or who subscribe to several mailing lists, probably will find their mailbox overflowing within a day or two. Because

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**Main Menu Listings include the following categories:**

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<td><em>yolo</em></td>
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**Figure 4.1** Representative General Mailing Lists

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IV. E-Mail, Faxmail, and Voice Mail as Distance Learning Tools
mailing lists are so active, they're a good source for discussing topics, asking questions, sending advice, sharing experiences, and simply networking with people who share the same interest. Learners can therefore build a network of international contacts quickly and they can learn a great deal by asking their online colleagues for guidance or assistance. Mailing lists are an excellent way to foster mentoring relationships.

USING MAILING LISTS IN A DISTANCE LEARNING COURSE

Because subscribers of mailing lists dealing with work-related topics (in contrast to hobby-oriented or fun mailing lists) tend to be professionals who joined the list to share business-related concerns, protocol for mailing lists about professions should be followed exactly. Very practically, learners who send messages to their colleagues, or potential employers and colleagues, should carefully write and respond to posts to the list; their messages will be more carefully scrutinized than those sent to hobby-related lists.

Many professionals are encouraged to follow threads of discussion about topics they need to understand for their job; they may become impatient if the list becomes clogged with irrelevant or poorly written posts. These readers simply don't have the time to read through, much less respond to, posts from newbies who fail to follow the list's protocol. Educators/trainers should therefore make sure that learners understand the purpose of each mailing list and the protocol for the lists, whether very informal or highly professional, before they begin posting messages to a list.

If you're an educator or a trainer who wants to supplement course materials with discussions on a mailing list, you should do the following:

1) Locate the addresses of mailing lists about your course's content.
2) Subscribe to and monitor the lists you want learners to join. Become familiar with the audience and common topics covered by the list.
3) Download and distribute the introductory notice from the listserv to learners who will be subscribing.
4) Ensure that learners are familiar with writing effective e-mail messages.
5) Provide learners with the addresses of lists in which they may want, or will be required,
to participate.

6) State clearly how learners will use information gathered from mailing lists in the current course.

7) Send a message to the list, explaining how the people participating in your course will be using the list. Encourage the current members of the list to welcome the newbies.

4. NEWSGROUPS

Newsgroups are often called discussion groups, as are mailing lists. Discussion groups also can be created within a LAN, such as a group of learners who want to discuss a topic just within their group. This group may set up a specific time in which to conduct a discussion with numerous participants. A newsgroup or a mailing list, on the other hand, is a wide-open forum for anyone with access to the Internet to add comments to an ongoing discussion, provide news, start a new thread of conversation, and so on.

Newsgroups, like mailing lists, are listed by interest area. If a course involves travel, for example, participants may want to post general questions to other people outside the course so that they can learn more about travel to a particular area. Messages are usually grouped by theme, so that the original message and responses to it can be easily located.

Each message's title will be displayed on a menu list of hypertext links directly below the originally posted topic. To view the ongoing thread of a particular discussion, readers only need to move from one link to the next in the hierarchy to follow the comments. If some messages in the hierarchy don't seem interesting, they can be skipped; the posts can be read in any order and readers can see all, a few, or none of the posts, as they like.

Most browsers have a separate button, menu item, or hypertext link to locate an updated list of all newsgroups. From this general listing, users can move through other layers of links which refer to more specific lists of topics. For example, a list of newsgroups marked 'rec.*' may include several listings for newsgroups about recreation, including such diverse topics as skydiving, video, biking, and travel. A click on the specific hypertext link referring to a recreation topic, like travel, brings up the most recent posts for that newsgroup. Previous posts can be retrieved through another hypertext link. Clicking on a particular post brings up the specific message, which can be read, printed, saved to a file, or responded to. Users
who want to reply to the posted message can immediately send a message, which will be added as the next post in the continuing discussion of the topic. The newsgroup continues discussing the item of interest until the thread dies out, usually within a day or two.

Newsgroups are a good way to generate comments and feedback about a particular topic. They can be useful to learners and educators who want to expand the number of perspectives offered by the current group of course participants. However, like individual e-mail messages or those posted to discussion groups or mailing lists, the information from a newsgroup is as likely to be inaccurate, misleading, inappropriate, or useless as it is to be helpful, insightful, polite, and accurate.

In short, information gleaned from newsgroups should be scrutinized just as carefully as information from any other source. Simply because someone posted a reply doesn't mean that the information is more useful or accurate than information from other sources. However, newsgroups do generate lots of comments and a hot topic can provide lots of open-ended discussion for several days. They can be an interesting source of information to be used with courses.

5. MULTIPLE-USER DOMAINS/DIMENSIONS (MUDS)

A multiple-user domain, also known as a multiple-user dimension (MLTD), facilitates conversation in real time among several participants. Although many people still think of MUDs as places where users can role-play or create an elaborate game setting, MUDs are increasingly used in educational settings. They allow learners to take on a persona, if they like, to role-play work-related situations, for example. They also give participants a place in which to chat with others about a topic.

MUDs can be very simple, involving text-only conversations that have to be keyed in. However, with the advent of more advanced hypermedia applications, may allow participants to talk to each other. The latest technology allows users to scan in images, such as a head shot, that can be attached to a movable on-screen "body." This virtual person can be manipulated around a virtual coffee shop, library, or other setting to interact with other virtual people. As the technology becomes more sophisticated and more commonly used, MUDs can provide a virtual environment for more formal collaboration, simulations, demonstrations, and role playing.
USING A MUD IN A DISTANCE LEARNING COURSE

If you're an educator or a trainer interested in using a MUD for people enrolled in your course, you might try the following:

1) Determine the best time for a group meeting. If learners are scattered across different time zones or are limited in their online access, you may have to set up several times for the meeting.

2) Establish rules for using the MUD, so that everyone can participate equally. If you're developing a role-play, state the rules for adopting roles and acting out a scenario. Make sure that some outgoing personalities don't take over the role-play; monitor the MUD to ensure that everyone is participating.

3) Publicize the well in advance of its use. Make sure that all learners know how to access the site and what to do, as well as when the MUD will be active.

4) State how the MUD will be used in the course and how learners will use the information and experiences gained from their participation as part of the course. The course syllabus, as well as assignments and reminders before the MUD are good places to describe the MUD and how it should be used. You may want to set up a FAQ if you're also providing information at a Web site.

5) Facilitate the MUD and oversee its use. As real-time online interaction becomes more accessible to all potential users, MUDs will provide more educational and training opportunities. As learners interact in virtual environments, the types of simulations and skill practice they can encounter are "virtually" limitless.

6. FAXMAIL IN A DISTANCE LEARNING COURSE

An 'in-between' technology that in some ways resembles e-mail, fax, and voice mail is faxmail. This fax and voice mail system allows learners and educators/trainers to send and receive messages anytime. The "voice mail for taxes" is delivered to an electronic address, from which the recipient can retrieve the
information via a fax machine or fax modem. This system allows learners to receive and send information even when they aren't near a computer to pick up their e-mail messages. All learners need to do is find a fax machine so they can retrieve the information about their course.

Sometimes long documents may be difficult to attach to e-mail messages. Faxmail helps solve the problem of long attachments or documents with lots of graphics.

This type of communication can be the primary means of transmitting information among educators/trainers and learners, as the University of Phoenix's Center for Distance Education uses for distance learning courses. Faxmail can also be used as a way to supplement other types of communication, including e-mail or voice mail.

7. VOICE MAIL IN A DISTANCE LEARNING COURSE

Voice mail allows the personal touch of voice communication, with all its nuances; this tool lets learners and educators/trainers develop a better sense of the people behind the course. Because most phone systems are designed to record voice mail messages at any time, learners and educators/trainers can communicate with each other at any time, from any place with available telephones. Like faxmail, voice mail can be picked up at any time and no computer technology is required to access the message. These strengths can make voice mail more useful to learners who currently lack access to e-mail.

Nevertheless, voice mail offers some obvious disadvantages, too. The length of the message may be limited to three or fewer minutes, which may not be enough time to leave the complete message. If the person leaving the message is skilled in leaving a voice mail message, the recording can be an effective communication tool. If the person meanders around the reason for the message, lacks focus, or has distracting vocal mannerisms, the message may be difficult to understand.

To make the most of voice mail communication, follow these guidelines when you leave a message:

1) Know what you want to say. You may need to jot down the key points or questions for your message before you dial. If you are requesting information or need to ask a question, be specific in identifying exactly what you need. If you're leaving information that's been requested, write it down so that you can clearly and easily give the pertinent infor-
2) Identify yourself. State your name, phone number, and so forth, so that your listener knows immediately who you are and where you're from.

3) Keep the message brief. If you have several points to make, you may need to leave more than one message. If you do, make sure that each message has its own purpose and main point. Be direct; state your message clearly. Limit the amount of information in one message so that you don't have to rush through the information.

4) Speak clearly and loudly enough to be recorded. Enunciate. Speak in a normal tone, with conversational inflection. Be pleasant.

5) If you don't receive a response (and one was required) within two days at most (depending upon the urgency of the message), make a follow-up call.

When you play your voice mail messages, follow these guidelines:

1) Write down the caller's name, phone number, and purpose of the message.

2) Listen to the rest of the message.

3) Save the message.

4) Replay the message to check the information and pay attention to vocal cues indicating the caller's mood.

5) Respond to the message after you're played all messages.

6) Keep a log of the messages you send and receive for each person during the course.

8. CHECKLIST FOR E-MAIL, FAXMAIL, AND VOICE MAIL COMMUNICATION IN DISTANCE LEARNING COURSES

E-mail can be used as a primary means of transmitting course information, similar to correspondence courses offered through surface mail. But e-mail, faxmail, and voice mail also can become important supplementary components in distance learning courses offered through other technologies. If you're planning to use any or all of these tools in your course, you should ask the following questions as part of your
checklist to help determine how these devices can be used most effectively:

- Should e-mail use be required or simply encouraged?
- Should faxmail use be required or simply encouraged?
- Should voice mail use be required or simply encouraged?
- Will all these tools be used equally or will learners be encouraged to use one tool more than others?
- What are the e-mail technical requirements for participants of the course?
- What are the faxmail technical requirements for participants of the course?
- How can the course be simply structured so that most information can be completed with online texts and simple graphics that can be sent via e-mail or faxmail?
- How can e-mail, faxmail, and/or voice mail supplement other types of instruction (e.g., distribution of materials by surface mail, videoconferences, use of Web sites to store information)?
- How often will information be sent to learners?
- How quickly will feedback be provided?
- How often will feedback be provided?
- How often will learners be expected to respond via e-mail, faxmail, or voice mail?
- In addition to regular e-mail, what types of electronic communication are required for the course (e.g., subscription to mailing lists)?
- In addition to regular e-mail, what types of electronic communication are encouraged or suggested for the course?
- How much instruction will learners need to use the e-mail, faxmail, or voice mail system(s)?
- How familiar are users with the protocol of writing and responding to e-mail, faxmail, and/or voice mail messages?
- What are the guidelines you've established for conducting the class via e-mail, faxmail, or voice mail?
E-mail, voice mail, and faxmail are simple tools, not nearly as technically advanced as other online distance learning technologies, but alone or collectively they can be highly effective in providing materials and communicating with learners. Many learners will be familiar with e-mail and voice mail, although they may have little experience with other forms of electronic information. E-mail may be more easily accessible than other electronic tools, too, although learners without constant access to computers may not want to rely only on e-mail for course communication. At times, faxmail or voice mail, which can be accessed without computers, may be preferable to e-mail or other distance learning tools.

When you're planning a distance learning course, you should try to include e-mail as at least one communication method to link learners, educators/trainers, and experts who can provide other sources of information. Voice mail and faxmail can be good supplementary tools to work with e-mail or other distance learning technologies.
V. INSTRUCTIONAL DEVELOPMENT FOR DISTANCE EDUCATION

1. THE NEED FOR INSTRUCTIONAL DEVELOPMENT

Instructional development provides a process and framework for systematically planning, developing, and adapting instruction based on identifiable learner needs and content requirements. This process is essential in distance education, where the instructor and students may share limited common background and typically have minimal face-to-face contact.

Although instructional development models and processes abound (see Dick & Carey, 1990; Gustafson & Powell, 1991), the majority follow the same basic stages of design, development, evaluation, and revision.

![The Instructional Development Process](image)

Figure 5.1 The Instructional Development Process
2. THE DESIGN STAGE

- Determine the need for instruction - To begin, determine the need for instruction by considering what external data verify the need, what factors led to the instructional need, and what past experiences indicate that the instruction being planned can effectively meet this need.

- Analyze your audience - To better understand the distant learners and their needs, consider their ages, cultural backgrounds, past experiences, interests and educational levels. Assess their familiarity with the various instructional methods and delivery systems being considered, determine how they will apply the knowledge gained in the course, and note whether the class will consist of a broad mix of students or discrete subgroups with different characteristics (e.g. urban/rural, undergraduate/graduate). When possible, the instructor should visit distant sites and interview prospective students, both individually and in small groups. This personalized attention will also show students that the instructor is more than an anonymous presence, linked by electronic technology. Colleagues who have worked with the target population can also offer advice.

- Establish instructional goals/objectives - Based on the nature of the problem as well as student needs and characteristics, establish instructional goals and objectives. Goals are broad statements of instructional intent, while objectives are specific steps leading to goal attainment.

3. THE DEVELOPMENT STAGE

- Create a content outline - Based on the instructional problems, the audience analysis, instructional goals and objectives, and an understanding of the desired course content, create an outline of the content to be covered.

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• Review existing materials - Next, the instructor should review existing materials. Instructional materials should not be used solely because they are readily available or have been effective in a traditional classroom setting (see Beare, 1989). This is especially true if pre-packaged materials, such as telecourses, are being considered. Whereas many pre-packaged instructional tools are developed and marketed to reach students with similar backgrounds and experiences, they may have little relevance for distant learners who come to the course with widely varied and non-traditional experiential backgrounds. If pre-packaged materials are to be used, consider developing “wrap around” introductions, conclusions, and summaries that specifically relate the learning materials to the instructional context of the distant student.

• Organize and develop content - Perhaps the greatest challenge facing the distance educator is creating student-relevant examples. Content, for the most part, is taught using examples that relate the content to a context understood by the students. The best examples are “transparent”, allowing the learners to focus on the content being presented. If examples are irrelevant, learning is impeded. This is a special challenge in rural and multicultural settings where the teacher’s realm of experience and related content examples may be foreign to distant learners. To address this problem, discuss potential content examples with a sampling of the target audience.

• Select/develop materials and methods - The development of instructional materials and selection of delivery methods will often require integrating print, voice, video, and data technology in concert with face-to-face communication. The challenge here is to integrate delivery components, based on identifiable learner needs, content requirements, and technical constraints. For example, it does little good to rely on delivery technology that is unavailable to some class members. Make sure the same delivery systems are available to all distant learners to avoid the need to create parallel learning experiences.
4. THE EVALUATION STAGE

- Review goals and objectives - One purpose of evaluation is to determine if the instructional methods and materials are accomplishing the established goals and objectives. Implementation of instruction represents the first real test of what has been developed. Try to pre-test instruction on a small scale prior to implementation. If this is not possible, the first actual use will also serve as the "field test" for determining effectiveness.

- Develop an evaluation strategy - Plan how and when to evaluate the effectiveness of the instruction.

Formative evaluation can be used to revise instruction as the course is being developed and implemented. For example, the distance educator can give students pre-addressed and stamped postcards to complete and mail after each session. These "mini-evaluations" might focus on course strengths and weaknesses, technical or delivery concerns, and content areas in need of further coverage.

Summative evaluation is conducted after instruction is completed and provides a data base for course revision and future planning. Following course completion, consider a summative evaluation session in which students informally brainstorm ways to improve the course. Consider having a local facilitatory run the evaluation session to encourage a more open discussion.

Within the context of formative and summative evaluation, data are collected through quantitative and qualitative methods. Quantitative evaluation relies on a breadth of response and is patterned after experimental research focused on the collection and manipulation of statistically relevant quantities of data.

In contrast, qualitative evaluation focuses on a depth of response, using more subjective methods such as interviews and observation to query a smaller number of respondents in greater depth. Qualitative approaches may be of special value because the diversity of distant learners may defy relevant statistical stratification and analysis. The best approach often combines quantitative measurement of student performance with...
open-ended interviewing and non-participant observation to collect and assess information about attitudes toward the course's effectiveness and the delivery technology.

- Collect and analyze evaluation data - Following implementation of your course/materials, collect the evaluation data. Careful analysis of these results will identify gaps or weaknesses in the instructional process. It is equally important to identify strengths and successes. Results of the evaluation analysis will provide a "springboard" from which to develop the revision plan.

5. THE REVISION STAGE

There is room for improvement in even the most carefully developed distance delivered course, and the need for revision should be anticipated. In fact, there will likely be more confidence in a course that has been significantly revised than in one considered flawless the first time through.

Revision plans typically are a direct result of the evaluation process in tandem with feedback from colleagues and content specialists. The best source of revision ideas may be the instructor's own reflection on course strengths and weaknesses. For this reason, revision should be planned as soon as possible after course completion.

Often, course revisions will be minor, such as breaking a large and unwieldy instructional unit into more manageable components, increasing assignment feedback, or improving student-to-student interaction. On other occasions, major revisions will be needed. Significant course changes should be field-tested prior to future course use.

Test revision ideas on small groups of distant learners, content specialists, and colleagues. Results of this process should be tempered by the knowledge that the characteristics of each distant class will vary and that revisions required for one learner group may be inappropriate for a different student population.

While it is possible, even appropriate on occasion, to shorten the instructional development process, it should be done only after considering the needs of the learner, the requirements of the content, and the constraints facing both teacher and students. Adhering to sound principles of instructional development
won't overcome all obstacles one encountered en route to developing effective distance education programs. It will, however, provide a process and procedural framework for addressing the instructional challenges that will surely arise.
VI. EVALUATION FOR DISTANCE EDUCATORS

1. GOAL OF EVALUATION

Effective teachers use a variety of means, some formal and others informal, to determine how much and how well their students are learning. For example, to formally evaluate student learning, most teachers use quizzes, tests, examinations, term papers, lab reports, and homework. These formal evaluation techniques help the instructor to evaluate student achievement and assign grades.

To evaluate classroom learning informally, teachers also use a variety of techniques. For example, teachers pose questions, listen carefully to student questions and comments, and monitor body language and facial expressions. Informal, often implicit evaluations permit the teacher to make adjustments in their teaching: to slow down or review material in response to questions, confusion, and misunderstandings; or to move on when student performance exceeds expectations.

When teaching at a distance, educators must address a different teaching challenge than when teaching in a traditional classroom. For example, instructors no longer have:

- A traditional, familiar classroom.
- A relatively homogeneous group of students.
- Face-to-face feedback during class (e.g. students’ questions, comments, body language, and facial expressions).
- Total control over the distance delivery system.
- Convenient opportunities to talk to students individually.

For these reasons, distance educators may find it useful to not only formally evaluate students through testing and homework, but to use a more informal approach (see Angelo and Cross, 1993) in collecting data to determine:

- Student comfort with the method used to deliver the distant instruction.
• Appropriateness of assignments.
• Clarity of course content.
• If class time is well spent.
• Teaching effectiveness.
• How a course can be improved.

2. TYPES OF EVALUATION

Evaluation can be either formative, summative, or a combination of both.

Formative evaluation:

• Is an on-going process to be considered at all stages of instruction.
• Will enable the instructor to improve the course as he/she proceeds.
• Facilitates course and content adaptation.
• Will identify major gaps in the instructional plan or the need for minor adjustments.

Some strategies that educators can use to collect formative data from their distant students include:

• Post cards - provide each student with prestamped and preaddressed postcards. On a weekly basis, have students use the postcards to share their concerns or respond to questions during the last three to five minutes of class.
• Electronic mail - Can be a very effective way for instructors and students to communicate. Another plus, while the instructor is eliciting information about classroom learning, students become familiar with the use of electronic mail, a valuable skill.
• Telephone - Call students often. Ask them open ended questions (e.g., "What snags did you run into on the second writing assignment?") to let students voice their concerns. Follow with probes (e.g., "Then, will you need more information sources?"). Set phone-in office hours but be sure to welcome calls at other times.
Summative evaluation:

- Assesses overall effectiveness of the finished product or course.
- Can be a springboard in developing a revision plan.
- Can be a baseline of information for designing a new plan, program, or course.
- Will not help current students since it is conducted upon course completion.

Some questions that educators may want to ask students when collecting summative data include:

- List five weaknesses of the course.
- List three (or five) strengths of the course.
- If you were teaching the course, what would you do differently?
- Student background information: age, level in school, number of distance delivered course taken prior to this one.
- What would you recommend to a friend planning to take this course?
- What did you think would be covered in this course but was not?
- Would you recommend this course to a friend? Why or why not?

3. EVALUATION METHODS

Within the context of formative and summative evaluation, data may be collected through quantitative and qualitative methods.

Quantitative evaluation:

- Involves asking questions which can be statistically tabulated and analyzed, frequently using a scale, check list, or yes/no responses.
- Limits students to responding to the categories made available to them.
• Needs a large student sample for relevant statistical analysis.

Quantitative methods may be most useful for gathering information on large numbers of respondents for whom more in-depth, personalized approaches are not feasible. However, they do have some significant drawbacks:

• Many distance education courses have relatively small class sizes with students from various backgrounds. These small, stratified populations typically defy relevant statistical analysis.
• Quantitative surveys typically result in a rate of return of under 50 percent. A low rate of return often suggests that only those feeling very positively or negatively about the course responded to the evaluation.
• By definition and design, forced choice surveys offer respondents a limited number of possible response options. Therefore, fresh insights and unique perspectives falling outside the provided response categories go unreported.
• The cumbersome and often tedious nature of quantitative data collection can discourage formative evaluation, and often results in an over-reliance on summative evaluation.
• Statistical analysis often results in an illusion of precision that may be far from reality.

Qualitative evaluation:

• Is typically more subjective.
• Involves gathering a wider range and depth of information.
• Is more difficult to tabulate into neat categories.
• Will be less affected by typical small class size.
• Is a more flexible and dynamic method.
• Is not limited to pre-conceived topic of inquiry.
• Allows for student output of topics.

Can use:

VI. Evaluation for Distance Educators
• Open ended questioning -- with respondents asked to identify course strengths and weaknesses, suggest changes, explore attitudes towards distance delivery methods, etc..
• Participant observation -- with the distance educator observing group dynamics and behavior while participating in the class as an observer, asking occasional questions, and seeking insights regarding the process of distance education.
• Non-participant observation -- with the distance educator observing a course (e.g., an audioconference, interactive television class, etc.) without actually participating or asking questions.
• Content analysis -- with the evaluator using predetermined criteria to review course documents including the syllabus and instructional materials as well as student assignments and course-related planning documents.
• Interviews -- with a facilitatory or specially trained individual collecting evaluative data through one-on-one and small-group interviews with students.

4. WHAT TO EVALUATE

Consider the following areas:

• Use of technology - familiarity, concerns, problems, positive aspects, attitude toward technology.
• Class formats - effectiveness of lecture, discussion, question and answer; quality of questions or problems raised in class; encouragement given students to express themselves.
• Class atmosphere - conduciveness to student learning.
• Quantity and quality of interaction with other students and with instructor.
• Course content - relevancy, adequate body of knowledge, organization.
• Assignments - usefulness, degree of difficulty and time required, timeliness of feedback, readability level of print materials.
• Tests - frequency, relevancy, sufficient review, difficulty, feedback.
• Support services - facilitatory, technology, library services, instructor availability.
• Student achievement - adequacy, appropriateness, timeliness, student involvement.
• Student attitude - attendance, assignments submitted, class participation.
• Instructor - contribution as discussion leader, effectiveness, organization, preparation, enthusiasm, openness to student views.

5. EVALUATION TIPS

• Check out and adapt already published questionnaires; there’s no need to re-invent the wheel.
• Draft and revise questions; change if necessary.
• Make use of follow-up probes:
• Alternate between instruction and interaction.
• Sequence your questions for best effect - go ahead and ask for suggestions for improvement before asking for what is good. This will help convey sincerity for seeking improvements.
• Place open ended questions after quick answer questions. This gives students built-in thinking time.
• On summative evaluation, assure anonymity. This can be accomplished by having all questionnaires sent to a neutral site where they would be removed from their envelopes and forwarded to the instructor without a postmark.
• Establish rapport by being interested and supportive. Withhold judgmental responses.
• Adapt to the student in degree of formality and pace of communication.
• Use evaluation as a method for understanding teaching and learning.
• Try to get both positive and negative feedback. It is important not only to know what is not working, but also what is working.
PART II. THESIS PROJECT
VII. THE VIRTUAL CLASS ON THE INTERNET

1. INTRODUCTION

As the enormous growth of the Internet, virtual classes over the Internet - the worldwide conglomeration of computer networks will reach into tens of millions of homes and business in the near future. When I went to Korea last summer, one of the hot issues in the education was the virtual class. I decide to evaluate the present virtual classes and create a model for these classes.

The thesis project is about creating a web site for the virtual class. The subject is created on a computer-based subjects such as learning a software. The virtual class can be on with CD-ROM or the web at the same time. The site is interactive with student participation.

The goal of this virtual class project is learning a video editing software - After Effects 3.0™ with the internet. The class will mostly rely on the on-line lecture. If the audience has a problem the using internet, the communication between the user(=audience) and class can't be complete. For this reason, a basic knowledge and experience of the internet and computer is required.

2. A SYSTEMATIC APPROACH TO DESIGNING TRAINING MATERIAL

1) Analysis

- Describe the problem
- Define the problem in performance terms
- Write a measurable final objective
- Describe the target group

2) Design

- Check for other existing or possible solutions
- Use pyramid analysis to break down the objective into topics
• Write subordinate objectives
• Group sub-objectives according to learning type
• Choose media for each module
• Check the potential for using performance aids
• Write tests for each modules, then the learning objectives

3) Development

• produce the materials for each module

4) Testing and improvement

• One-to-one trials and small group pilots
• Revise

5) Implementation

• Implementation

6) Evaluation

• Evaluate after a suitable period of use to see whether the desired performance has been achieved.

3. USER DEFINITION

The audience will be students who register for a distance-learning class. They should be able to use other applications which help to visualize images such as Adobe Photoshop™. The audience could be narrowed to someone who has taken the design classes before.
• Age
  approx. 18-60

• Education
  should have been educated about computer
  higher than high school

• Experience
  The audience should be able to use some applications to create images
  Basic knowledge of Internet is necessary

• Machine Environment
  Computer system: Mac OS
  Memory : 32 MB or higher
  Monitor Resolution : at least 832 x 624 or higher
  Color depth : Thousand color supported
  Application : After Effects 3.0TM
  Netscape Communicator 4.5TM with shockwave plug-in

4. CONTENT AND NAVIGATION

The project <virtual class> is about learning a tutorial of After effectsTM with internet. The basic content and text of the tutorial come with a software package created by Adobe System Inc. The tutorial is basically creating a movie clip with various types of sources such as PICT files, Illustrator files, sound clip and QuickTime movie clip.

The content of the tutorial is like this;
1. Starting a project
2. Working with layers in time
3. Creating a nested composition
4. Making layers fade in and out
5. Animating an object along a bezier motion path
6. Applying an effect to a layer
7. Adding sound and rendering a movie

Before starting the tutorial, the general descriptions of palettes and windows are given. The content of virtual class is divided into four chapters to reduce the file size, so that to increasing the loading speed through internet.

In order to the convenient organization, the detail information and explanations are separated into several sections in each chapter. The Section is further separated into several pages. For example, demonstration of setting a composition is one of pages in 'Starting a project' section.

- Chapter One
  Introduce windows and palettes

- Chapter Two
  1. Starting a project
  2. Working with layers in time

- Chapter Three
  1. Creating a nested composition
  2. Making layers fade in and out

- Chapter Four
  1. Animating an object along a bezier motion path
  2. Applying an effect to a layer
  3. Adding sound and rendering a movie
5. TOOLS AND MATERIALS

Several applications are used for the project. To make an interactive on-line class, two applications,
Macromedia Flash™ and Macromedia Director™, are considered as a major part. Both applications have
good options to create the interactive project on web.

Macromedia Director is very powerful software to create a variety of interactive multimedia pro-
ductions, including business presentations, web content (with Shockwave Player or Java), interactive
advertising pieces, kiosks, and CD/DVD ROM titles and games.

Flash is the web standard for vector graphics and animation. Flash is widely used by Web design-
ers to create beautiful, resizable, and extremely compact navigation interfaces, technical illustrations,
long-form animations, and other dazzling effects for their site. Flash files can play back with the
Shockwave Player or Java. Flash and Director can be used together to create the most feature-rich web
sites around.

To show the demonstration of tutorial as a real animation, CameraMan 2.5™ is used to capture
the real-time movement in desktop. Adobe AfterEffect™ and Adobe premiere™ are used for converting
and compressing the movie clip to PICT files. For editing and creating the image process, Adobe photo-
shop™ and Adobe illustrator™ are employed. To deliver the project on internet, Dreamweaver 1.2™ is
used to handle HTML and Netscape communicator 4.5™ is used as a final presentation tool.

List of software used;

• Adobe After Effects 3.0
• Adobe Illustrator 7.0
• Adobe Photoshop 5.1
• Adobe Premiere 5.0
• CameraMan 2.5
• Dreamweaver 2
• Macromedia Director 7.0
• Macromedia Flash 3
6. TECHNICAL PROCEDURE

1) Capture the real-time animation on Desktop

The tutorial from Adobe is text-based. Every description and procedure to make a sample movie is written in order. The learner has to read the detail for the description. As the steps are new to the learner and needs lots of details such as short-cut keys, it is difficult to speed up the learning. Whereas, the graphical explanations and preview are easy to understand and reduce the time of learning. But the detail description is easy to be skipped. Therefore, the best way to present the procedure is to show the real-time animation on desktop to cover all considerations.

The software called ‘CameraMan 2.5’ is a quick, flexible and inexpensive method of producing tutorials, customized training demos, presentations, internet movies and on-line support files. CameraMan enables the user to make simultaneous recordings of screen activity, system sounds and voice-overs. It captures all action that takes place on the screen including; pull-down menus, dialogue boxes, still screens and animations, video, and game sequences. With smooth, full-screen recording, panning, or follow-the-cursor mode, screen recordings can be saved as AVI movies or bitmaps (Windows version) or QuickTime files (Macintosh version). Files created using CameraMan for Windows can be integrated into any Video for Windows applications including; Internet Explorer, Macromedia Director, Adobe Premiere, and Microsoft PowerPoint, (to name only a few). Files created using CameraMan for Macintosh can be integrated into any applications which support object linking and embedding (OLE) or QuickTime, including: Netscape Navigator, Adobe Acrobat, and Microsoft Word For Windows.
For screen recording:

- still screen capture
- high-speed recording for smooth playback
- simultaneous recording of screen activity, system sounds and voice-overs
- capture pull-down menus, dialogue boxes, still screens and animations, video, and game sequences
- smooth full-screen, panning, or follow-the-cursor mode recording options
- save movies as AVI or bitmap files (Windows version) or QuickTime files (Macintosh version)

For sound recording:

- edit and record multiple sound tracks
- import, cut, copy, and paste - graphics, movie files, sound and music clips
- record sound tracks and synchronize them to precise points within a movie
- integrate CameraMan movies into any Video for Windows application (Windows version) or any application that support object linking and embedding (OLE) or QuickTime

![CameraMan™ Settings](image)

Figure 7.1 Setting window of CameraMan 2.5
There are four main options to control output. The output format are PICS, QuickTime and Sequential PICTs. The setting of CameraMan for this project is listed below:

- Format : QuickTime
- Frames/Sec : 2
- Movie Area : Full Screen
  (See Figure 7.1)

2) Integrate the desktop animation with description

The QuickTime movies captured by CameraMan contain the whole process of the tutorial as graphical information. Macromedia Director is used as main software to combine those images with explanations. All images are converted to 8-bit from 32-bit and cut as small as possible to reduce the file size. To keep the file size as small as possible for the web application, each director files only contain the information of one chapter. After the director files are converted to the shockwave files, the size range of each shockwave files is from 539k to 804k.

3) Screen design for Web-based virtual class

① We should consider to use clear, effective writing appropriate to the target group. Follow rules for good layout:

- Choose a style and stick to it
- Avoid too much text
- Just enough white space to give an active feel
- Mix graphics and short sentences but do not overdo it
- Use unjustified right-hand margins
7. Click the underlined Scale value, and in the Scale dialog box, type 0 for Width; the Height value changes automatically. Click OK.

Figure 7.2 Actual size of the project screenshot

- Allocate areas of the screen/page for specific purpose

The text for the virtual class is edited in such way that the procedure is based on the tutorial manual and reformat by following the above. (See Figure 7.2)

② Readable text on a screen

- Use a little text as possible
- Use it big
- Use short lines (like newspaper columns)
- Present text in natural block, not a page at a time
- Do not indent
- Use ragged, right-hand justification which is easier to read
- Avoid text wrapping around graphics
- Edit it thoroughly
- Avoid using too many fonts
- Use meaningful, active headings

③ Font

The fonts are carefully selected for the readability. The proper fonts are considered based on the testing survey of several people who have different major background and ages at the beginning of creative stage.
The fonts chosen for the project are Helvetica for most of the explanations and Chicago for the menu name and important instructions.

A B C D E F G H I J
K L M N O P Q R S T
U V W X Y Z
a b c d e f g h i j
k l m n o p q r s t
u v w x y z
1 2 3 4 5 6 7 8 9 0

Figure 7.3 Helvetica in 26 point
Figure 7.4 Chicago in 26 point

④ Screen design and layout

See the screenshots following.

- Overall and Interface design : Figure 7.5
Figure 7.6 Screenshot of the project - Chapter 1

Figure 7.7 Screenshot of the project - Chapter 2

VII. The Virtual Class on the Internet
VII. The Virtual Class on the Internet

Figure 7.8 Screenshot of the project - Chapter 3

Figure 7.9 Screenshot of the project - Chapter 4
Designing a virtual web class is an ongoing challenge and adventure. As technology changes, the developer will offer more interactive devices from the site and modify the learning environment continually to enhance learners' educational and training experiences. To keep being as the efficient virtual class on the web, it is the one of important points to keep in mind when creating the virtual classroom.

Distance learning doesn't provide all the answers to the education and training problems facing us today. In fact, it raises several more questions about the types of education and training that are needed and desirable. Distance learning offers several alternatives to our traditional concepts of learning, but more importantly, it has the potential to excite and enrich all of us as learners and educators. The format of instruction, methods of receiving and sending information, type of evaluation, ways to participate, cost, quality of instruction, and schedule for participating in courses vary among distance learning programs. Nevertheless, distance learning is and will be a primary means of education and training well into the next century.
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