

# Chapter 6

## *Training End Users*

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### Learning Objectives

*Upon completing this chapter, you should be able to:*

- Understand the importance of training in implementing end-user information systems.
- Identify the role of organizational, task, and individual analysis.
- Select appropriate methods for analyzing training needs.
- Apply adult learning principles in developing training strategies.
- Choose appropriate methodologies and media for training programs.
- Recognize the benefits of well-planned training programs.
- Develop performance and evaluation criteria for training programs.

## **6.1 INTRODUCTION**

Organizations and their workers are increasingly dependent upon technology. Key to the effective implementation of individual and collaborative work tools is that users know how to use them effectively and efficiently. When asked what percentage of the workforce requires computer training each year, Elliott Masie, “technology framing guru, always replies, “One hundred percent! Every time a piece of technology changes, an upgrade to an application is shipped, a new employee is hired, a reorganization is announced, or a new procedure is implemented, computer learning is required.”<sup>1</sup>

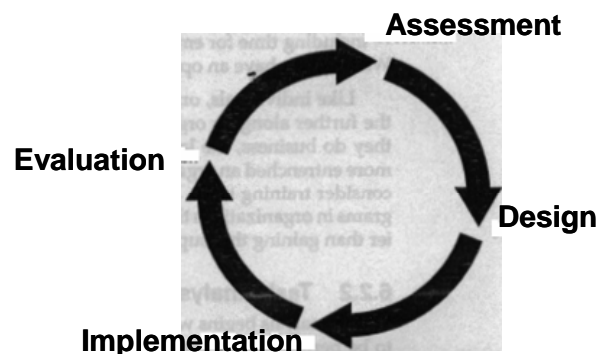
Training and support professionals can partner with the line manager, the end user, and the systems developer in designing and delivering effective learning strategies. Everyone has much to gain when these stakeholders work together. The manager, who is responsible for work performance, sees work done smoothly. The end user feels a sense of accomplishment. The systems developer finds acceptance for the system. Even technical deficiencies can sometimes be overcome if users understand how a system works and how it can help them work more effectively.

Despite the importance of training, however, EUIS training often is given a low priority; resources formally committed to training are often less than 2 percent of total IS resources.<sup>2</sup> This finding is contrasted with recommendations that at least 20 percent of the project budget go toward training. Other experts in EUIS recommend that investment in training should match dollar for dollar the investment in technology. In short, the key to ensuring that new technologies are used effectively is recognizing the value of

training and providing resources so that training can be done right. Even the most technically advanced system may fail if workers do not know how to use it.

In some organizations, turf wars exist between the IS department and the training department regarding who is responsible for end-user training. IS professionals report that trainers are not technical enough; trainers believe that “techies” do not have the interpersonal communications skills or instructional design skills they need. Regardless of who is responsible for training, it is clear that cooperation between the two departments is in the organization’s best interest.<sup>3</sup> Because online help and Help Desks are almost always part of an information systems department, not the human resources/training department, these learning options and their management are discussed in detail in the next chapter.

This chapter expands on the human side of systems implementation. It offers theoretical foundations and practical approaches to initial training and continual support for systems users, which typically involves human resource/training professionals. As used in this text, end-user training and support is a teaching/learning process whereby individuals acquire technology knowledge, skills, and abilities that enable them to perform their jobs more effectively. While *training* implies a learning experience that has a beginning and an end, *support* implies ongoing learning that empowers end users to use systems creatively and effectively. This chapter is organized into four sections around an action research approach to training: assessment, design, implementation, and evaluation. This action research approach, termed the *training cycle* here (see Figure 6-1), tells us that training solutions are best determined by those who have something to gain from the successful implementation of a new system—managers, end users, and systems analysts. Because the cycle data from one training effort become assessment data for the next, this cyclical approach supports effective, efficient training and organizational learning. Every system is different. What is important is that training and support are based on a clear assessment of performance requirements, are properly designed, are effectively implemented, and are evaluated for results.



**Figure 6-1** The training cycle

All training projects begin with research, whether the research is termed a needs analysis, needs assessment, or performance analysis. The goal is to determine what must be learned, who needs to learn, how that learning can best take place, and how best to use resources. A training program that is initiated as part of the implementation of a new system is an implementation strategy, and care should be taken that the training program

results in the *right* users learning the *right* skills in the *right* way for the *right* tasks in the *right* priority order.<sup>4</sup>

To ensure that everything is done *right*, it is important to assess the organization, the task, and the individual. Typically, formal investigations are best done in conjunction with the firm's organizational development or training department. Such professionals offer skills and an understanding of needs assessment methodology as well as the organization, the individual end user, and how the task fits into the end user's overall job. Not all training programs demand intensive, formal analysis. However, in designing any training program, the designer makes judgements on the knowledge, skills, and abilities (KSAs) of the target learning population. Therefore, it is important to know why such analyses are useful as well as research strategies that may be applied to determine the KSAs.

### 6.2.1 Organizational Analysis

Individual trainees are expected to acquire KSAs in one environment (training) and then use their new KSAs in another environment, back on the job. If what is learned in a training program cannot be used on the job, the training program is almost always considered a failure. Sometimes, when top management or supervisors are not part of the needs analysis process, training programs teach techniques or attitudes that are contrary to the way work is done. The way work is done is termed *organizational culture*, and a current evaluation of the morale of an organization is its climate. Specific questions to determine the organizational culture and climate include:

Is everyone committed to the training program?

Has everyone been involved in determining the training program's goals?

Will trainees be rewarded for their new skills?

How supportive is management in terms of providing corporate resources, including time for employees to learn?

Will trainees have an opportunity to *use* their new skills at their jobs?

Like individuals, organizations go through stages of development. Typically~ the further along an organization is in adapting information systems to the wa'. they do business, the larger their investment in training is.<sup>5</sup> In other words, the more entrenched an organization is in information systems, the more valuable they consider training to be. Thus, gaining support and commitment for training programs in organizations that have developed applications and infrastructures is easier than gaining that support in less technologically based organizations.

### 6.2.2 Task Analysis

A task analysis begins with task descriptions. Beginning with a summary of tasks to be performed, an expert in doing the task could be interviewed or an analyst could observe the expert doing the job. The task descriptions should follow some assessment technique. For example, *if* a large, geographically dispersed group must be contacted, a questionnaire might be the most effective approach. Well-designed questionnaires also result in objective numerical data. However, if users must be trained on a system immediately, observations may be adequate. Also, consider that while the time and costs involved with conducting one-on-one interviews and focus groups are high, qualitative data—while subjective—is considered rich and can provide more in-depth analysis of an issue.

TECHNIQUES	ADVANTAGES	DISADVANTAGES
Observation	Firsthand view of situation	Time consuming
Personal interviews	Interviewees carefully chosen	Not everyone is good at telephone interviews; subtle body language is missing
Telephone interviews	Less expensive than personal interview. Can be monitored and evaluated. 80% to 90% of those called usually agree to discuss	May be difficult to schedule; require strong group leader
Focus groups	Offer fairly reliable access to ideas and attitudes of a work group	May be difficult to schedule; require strong group leader
Questionnaires	Can reach a large audience at a limited cost; recipient can complete one at his/her leisure; offer anonymity to respondent; do not need a large staff to administer	Difficult to design; non-responses can diminish cost savings; possible bias; long turnaround; not sure the right person completes; requires statistical treatment

**Figure 6-2** Advantages and disadvantages of various investigation techniques for training assessment and evaluation

Figure 6-3 is a template for a value-added needs assessment interview, adapted from a strategy outlined by Meyer and Boone.<sup>7</sup> Note the emphasis on work tasks in this illustration.

Other guidelines for conducting needs assessments include using a variety of different needs assessment techniques when possible, and the selecting method(s) that involve as many stakeholders as possible. No matter how assessment is done, however, the target population—the end users—should be key participants.

Of all the steps in the training process, needs assessment is the most frequently overlooked—and the most important. The remainder of the process—design, delivery, and evaluation—is worthless if the right skills are not taught to the right people for the right tasks in the right way, and presented in the right priority order.

### 6.3 DESIGNING SUCCESSFUL PROGRAMS

The importance of careful needs analysis, especially for first-time users of computer systems, cannot be overemphasized. The mistake that training program designers frequently make is to cram everything about operating a system into a training program at the time of implementation and then walk away, believing that users are prepared to use the system effectively. Unfortunately, this type of training is often more a demonstration of system capabilities than skill development. This approach might be appropriate for experienced computer users who are learning a new system or software package, but it is not effective for most users. More often than not, such an approach leaves users overwhelmed, discouraged, and ill prepared to begin using the system. The likely result is that they will return to their jobs not knowing where to begin.

**Opening:** Put your interviewee at ease. Have a conversation opener ready; for example, “Congratulations on being the company’s salesperson of the year! I read about your success in our newsletter.”

**State the problem:** For example, “I’m from the training [or information systems] department. We’re doing an audit of our technology training options, and I’m here to see if we are offering workshops in areas you need. You’ve been selected because we know you have a reputation of being a whiz at computing and we want your advice.”

**Explain data collection and analysis procedures:** For example, “May I record this interview? I’ll be transcribing your responses and will keep those transcriptions anonymous. I’ll be writing a report, and will send you a copy.”

**Explain how long you anticipate the interview to be:** For example, “This interview session should take around 10 minutes. I’m going to ask you about your work, what computer tools you use, how the tools help you, and what you might want to learn more about.”

Divide your questions into useful categories as shown:

### **BACKGROUND**

What is your job title?

What are your job responsibilities?

How will you (or your boss) know if you are successful?

Describe your most important tasks/projects/goals.

### **TOOLS**

What computer tools do you currently use?

What tasks/activities do you use them for?

How would you describe your skill in using the tools?

### **BEHAVIORAL IMPACTS**

What do the tools do?

What would you do differently if the tools disappeared tomorrow?

### **BENEFITS AND EVALUATION**

What are the benefits to you?

### **FUTURE**

What are you doing now that you believe technology could assist?

Why aren’t you using those tools?

How would you prefer to learn to use the tools?

**Figure 6-3** Template for a value-added needs assessment

To design an effective training program, one must know not only what people need to learn but also how they learn. To be an effective trainer, one must master the subject being taught and also know appropriate methods of delivering that knowledge and know-how to the trainee.

A careful needs analysis ensures that training is done for the right things. The following sections provide an overview of how the EUIS analyst or planner can ensure that training is done the right way. Selected principles of adult learning are offered as a means of identifying assumptions that the trainer has about the learning population. After the theoretical foundations, this section describes individual and group learning and support strategies. Individual strategies include simple communications pieces, hands-on training, CDs, and Web-based Training. Group strategies include a computer fair, newsletters, and professional organizations. This section concludes with an overview of the use of technology to deliver training.

### 6.3.1 Principles of Adult Learning

*Andragogy* and *pedagogy* refer to the study of teaching. *Andra* comes from the Greek word *andr*, which means “man, not boy.” *Peda* comes from the Greek word *paid*, which means “child.” Both words use the Greek suffix *agogus*, which means “leading.”

As a theory, pedagogy originated with early monks who recorded common characteristics among children learning basic skills. Only in the middle of the twentieth century did instructors realize that their assumptions about learning did not fit the adults they were teaching. Andragogy, which originated in Europe, was introduced as a teaching theory in the United States in the 1960s by Malcolm S. Knowles. Andragogy is learner-directed learning experiences; pedagogy is teacher-directed experiences. Knowles emphasized that the two assumptions can coexist. The task to be learned and the individual’s learning style dictate whether a pedagogical or andragogical approach should be used in the design and delivery of a training program. For example, how would you prefer to learn each of the following?

- to use a new desktop publishing system
- to be oriented to a new job
- to understand French history
- to improve your writing
- to understand the technical aspects of Intranets

Your preferred learning style related to each of these learning tasks reflects a particular educational background and experience level. To improve desktop publishing skills, you may need to learn how to use the mouse in a hands-on workshop, or you may need to learn printing terms from a textbook, or you may want to learn elements of graphic design through a lecture on the topic. A new job could entail classroom-based informational training on corporate policies and benefits, job shadowing, and personal coaching. If you are a novice French history buff, you may learn best by the lecture method; however, if you are a graduate of a liberal arts program in French history, you may need to tour the French countryside to get the historical perspective that is desired. Likewise, to improve your writing skills, you may need a refresher course in grammar; or you could read Strunk and White’s *Elements of Style*; or you may need an intensive, hands-on workshop. Learning the technical points of Intranets could entail hands-on,

problem-based workshops or reading technical manuals. The point of this discussion is that andragogy and pedagogy are approaches that help you consider the individual learner's needs in guiding learning experiences, no matter how old the learner is (see Spotlight: Why It's Easier For Kids).

### SPOTLIGHT ON SOLUTIONS →Technology, People, Structure, Processes

#### WHY IT'S EASIER FOR KIDS

Documenting the problems adults have in learning to use computers has become a mini industry. There are so many bizarre stories that one begins to think that many of them are part of the Net culture of creating hoaxes. You may have heard a *few* yourself. The Help Desk that reported that someone thought the mouse was a foot pedal and couldn't get **it** to work. The secretary who was asked to copy a disk and came back with a photocopy. The man, confronted with the computer message "press any key to continue," couldn't find the "any" key on the keyboard. Another "hit" the keyboard so hard he broke **it**. When asked by a support line if she had Windows, one woman apparently replied, "No, we have air conditioning." One person was said to be found deleting files on a disk using white-out. Another, when instructed to "insert the disk and close the door," inserted the disk and then closed her office door. There are hundreds of stories

*Source:* Reprinted with permission from *Growing Up Digital: The Rise of the Net Generation* by Don Tapscott Copyright© 1998 by McGraw Hill Companies.

Following are some basic premises from what we know about how adults learn. These premises are applied to teaching/learning computer applications.

*For Adults, Learning Is Not Its Own Reward.* Adults are not motivated by gold stars or good report cards; they want a learning outcome that they can put to use. Because human behavior is directed toward goals, trainees learn best when they have a specific use for the knowledge or skill being taught.

Therefore, EUIS training strategists should remember that their trainees (adults) prefer practical, hands-on training sessions over general, theory-oriented classes. The best way to motivate individuals to learn a spreadsheet software package, for example, is to show them how they can apply it. Otherwise, trainees will probably learn very little.

*Adult Learning Is Integrative.* Adults bring a wide variety of knowledge and experiences to the learning situation. They learn best when they are able to integrate new ideas with what they already know. Moreover, if the information conflicts with what they know or value, learning is more difficult. Elliott Masie refers to an adult's information storehouse of knowledge as a hard disk and says that the reason adults have difficulty learning to use systems is that "most hard disks get write protected in one's early twenties."<sup>8</sup> Therefore, training strategies should build on what the trainee already knows.

For example, when teaching desktop publishing skills to administrative support personnel, the trainer could use word processing and printing terms to describe the desktop publishing software functionality. In a desktop publishing workshop for managers, however, the trainer could emphasize the advantages of desktop publishing over traditional typesetting. The trainee's previous experience with software programs



also influences the training methods that should be employed. In general, the more proficient trainees are with *any* applications package, the easier it will be for them to learn another software package.

In addition, value adjustments must be considered. Because EUIS change how work is processed, the trainee should know *why* the technology is used, as well as how to use it. In this case, *value adjustment* means understanding why work that has been done a specific way in the past will no longer be performed that way. Trainees will accept change more readily when they know why the change is taking place.

Trainees typically want more control over their learning experiences. Instructors should consult with trainees about curriculum content as well as evaluation strategies. Including trainees in these deliberations gives learners an opportunity to contribute to course content, instructional strategies, and learning goals that *fit* their own learning needs and styles.

*Practice Must Be Meaningful.* Repetition for repetition's sake does not produce a substantial learning effect. However, if repetition has meaningful results, learning can take place. This principle is borrowed from the work of E. L. Thorndike, an early leader in developing learning theory, who was opposed to meaningless drill.

Therefore, rather than have learners work on textbook or Computer-based Training drills, the trainer should have them "practice" on actual work in the learning environment. A similar suggestion is that trainees apply what has been learned "back at the desk" as an assignment or, in the language of training, as prework for the next learning session.

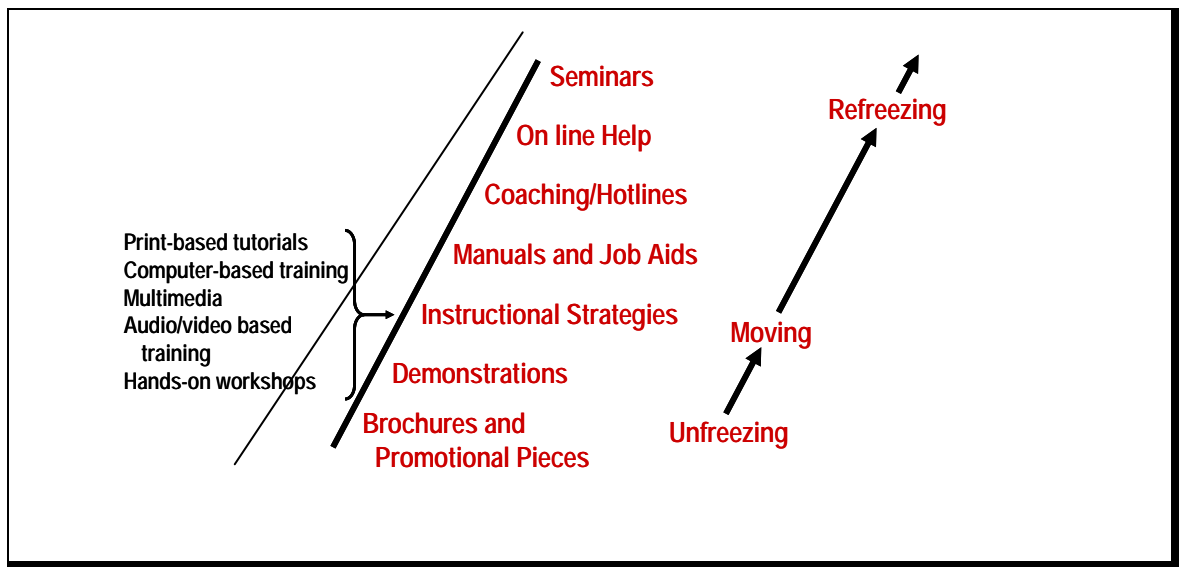
A related premise is that the older the trainees are, the slower they perform some psychomotor tasks. Older learners compensate for this by being more exact; they make fewer trial-and-error ventures and fewer errors. Therefore, trainees should be given every opportunity to proceed at their own pace. In many instances, self-paced learning materials, such as Web-based Training, can support self-paced learning. Some organizations, such as Apple Computer, give their employees a computer to take home, enabling learning to take place in the privacy of the home rather than in the office or classroom.

### 6.3.2 Individual Learning and Support Strategies

Individual learning and support strategies are specific ways that training can support a systems implementation within an organization. As part of an implementation plan, training on a given system can include one or any number of these strategies.

Innovators and early adopters (see Chapter 13, Innovation and Strategic Planning) find technology fascinating, and if they have sufficient time they will pick up class notes and computer manuals and learn on their own. Most people, however, will feel pressured to catch up on work that accumulated while they were in class for several days. They may try to use the system, flounder, and then return to doing their work in the usual manner, with the good intention of learning to use it as soon as they catch up on their work and can spare the time. By the time they return to the system, they will have forgotten 80 percent to 90 percent of what they learned in class. They may make excuses for not using it and, unless compelled by a superior, probably will use it only minimally or not at all.

A single training experience, a one-shot answer to a user's learning needs, is seldom enough to ensure system success. Individual learning and support strategies are presented here as part of a continuum of activities that address the training needs of a given population. Note from Figure 6-4 that training's role in implementation includes a variety of strategies that the trainer will adopt to the needs at hand. The continuum has simple awareness pieces (brochures and promotional pieces) at the bottom and seminars (implying high-level applications) at the top. The degree of implementation may be measured by Lewin's Unfreezing—Moving—Refreezing phases. (See Chapter 11, Organizational Change.) Unfreezing strategies attempt to get the targeted user group thinking about new ways to do work. Moving strategies are instructional approaches designed to ensure that the end user is able to apply the system to job tasks. Refreezing strategies are support strategies designed to ensure that the new system becomes the way work is done. Each of these strategies is discussed in the following section.



**Figure 6-4** Training as part of an implementation and learning support system

#### 6.3.2.1 Brochures and Promotional Pieces

The most basic implementation strategy is designed to instill awareness of the new EUIS and create motivation to use them. Brochures and promotional pieces that outline the capabilities of the target system should overview the system and explain how the system will help the end user do the job. The key premise is that awareness can defray user concerns about how the new system will impact an individual's job. Brochures and promotional pieces are unfreezing strategies, as they allow the end user to anticipate the system and be convinced of its value *before* being expected to use it.

#### 6.3.2.2 Demonstrations

Demonstrations involve an experienced user showing a prospective user how to use the new technology, typically on a one-time-only basis. The following example illustrates the use of demonstration for training:

Professor Quinn is suggesting to her research class that they learn to use a bibliographic management tool, ProCite. She begins her demonstration by talking about how she used to do library research with 3 x 5 index cards and a recipe box. She then shows the class a ProCite database she uses in her own work and quickly generates the end product—a perfect bibliography in APA style. She then shows how easy it is to produce that same bibliography in AMA style, one of a dozen other styles. The class is amazed. She then adds items to the database, by adding the class textbook and a journal article to the list. Opening up her Word Program, she drafts two short paragraphs of a research paper. When she needs to cite references from the database, she goes to the Word tool menu and opens “ProCite,” and then clicks “insert citation.” With three different references inserted, she generates a bibliography within Word. Learners see how the text changes and the bibliography is generated automatically. Professor Quinn listens to questions and then repeats the demo, encouraging her class to use the system on the library’s notebook computers as they do their research project.

When a demonstrator is training individuals who have had experience with the software, such as in the Professor Quinn example, learning new features or ways to use familiar features may not be a problem. In other words, when the technology is neither novel nor complex, a simple demonstration may suffice. A demonstration may be inadequate if it is hurried or if the trainee cannot keep up with it. In the earlier example, if learners were not competent already in using Word, the demonstration might not have been enough. Although end users ultimately will need to refer to the manual, help guide, or other instructional medium, they will have been motivated to want to learn the system, which is an important aspect of any training effort.

#### **6.3.2.3 Instructional Strategies**

The trainer who needs to provide end users with guided help in learning a system has a number of options. A specific strategy is selected depending on the performance objectives, the learning preference of the trainee, the trainee’s current expertise, time and money available for training, and how critical it is that the system be up and running by a specific date. Following is an overview of ways to move or deliver instruction. The pros and cons of print-based tutorials; Computer-based Training; multimedia, audio- and video-based training; Web-based Training; and hands-on workshops are detailed.

End users can be categorized as procedural or navigational learners. Procedural learners prefer to learn step by step. Navigational learners, on the other hand, prefer to learn by doing—exploring, making errors (which they learn from!) and asking for help at the specific time they need it. The instructional strategies that follow support learning preferences of either or both types of learners.

**6.3.2.3.1 Print-Based Tutorials** Manuals for off-the-shelf software sometimes include tutorials, or written descriptions and exercises designed to help the user learn how to use the software. These self-paced, linear tutorials can be used in initial training efforts by procedural learners. Understanding directions and tasks may be difficult for the novice, however, as manuals typically assume that the learner has a base of knowledge and technical vocabulary. Thus, as a training tool, print-based tutorials are of value primarily

to experienced computer users who want to learn new software programs. The following example illustrates the use of print-based tutorials as a training tool:

The EUIS task force has determined that corporate and divisional offices should use an updated package, Spreadsheet V. Currently, all employees use either Spreadsheet III or Superspread IV. Because all prospective trainees are proficient with an earlier version of the spreadsheet package, users will be expected to learn Spreadsheet V on their own, using the tutorial that is part of the new version's manual.

**6.3.2.3.2 Computer-Based Training** Computer-based Training (CBT) refers to a variety of techniques that use the computer as a training medium. *Information Week* reported results from a survey that found that the second-most-popular computer training method was the learner's own PC. The most popular method remained the hands-on workshop. Although the least-used training method was Web-based Training, Web-based Training is also the newest and fastest growing instructional method.<sup>9</sup> This section will overview a number of CBT options, with the caveat that learning should be the driving force for choosing an instructional medium. Technology for its own sake is to be avoided. "In short, don't let the flashy means of tech-delivered training blind you to the end: delivering learning."<sup>10</sup> Various terms have been associated with different types of Computer-based Training. Beginning with Programmed Instruction (PI) in the early 1950s, and cumulating today with Web-based Training, the use of technology to deliver instruction has been revolutionary

*Programmed Instruction (PI)*. PI originated with B. F. Skinner in the early 1950s. A behaviorist, Skinner theorized that for effective learning, students must be reinforced constantly. At that time, media for such experiences were either books or teaching machines. The book or teaching machine took the student, step by step, through learning activities (similar in many ways to print-based tutorials, mentioned previously). When students completed an exercise, they turned to the next page or frame and immediately knew whether or not their answer was correct. When the answer was incorrect, the correct answer was explained or the student was directed to review and then attempt to answer the question again. These early teaching machines, such as PLATO (Control Data Corporation) and AIS (McDonnell Douglas Corporation), required customized terminals and software.

*Computer-assisted Instruction (CAI)*. CAI expanded on PI principles but with an important difference; CAI did not require special hardware. The first CAI programs ran on mainframe computers. Today, CAI programs run on all types of hardware and are delivered by all types of media from disks to CDs to the Internet. Systems design projects often have CAI programs developed simultaneously with system design so that the training program is ready when the system is completed. Likewise, software vendors sometimes supply a learning disk, CD, or Web site link with their software. This tutorial, or CAI, offers various degrees of interaction between the trainee and the computer. Using the tutorial, the individual completes a series of lessons that include directions and practice in using the software. CAI often includes companion paper-based exercises and instructions.

*Computer-Managed Instruction (CMI)*. CMI systems, on the other hand, typically combine instructional modules with other classroom management tasks such as

enrollment management and other record keeping tasks. CMI systems can be used for testing, instruction, and/or maintaining student transcripts. They can generate, administer, and score tests. Many CMI programs have built-in pretests and posttests.

An example of CMI is Pathiore's Registrar system, which includes a wide range of reporting options including chargeback reports, cost performance reviews, and cost performance reports. Figure 6-5 illustrates a sample individual transcript report. Note that the report provides information regarding not only where Artie Alvares, Ramesh Baheri, Gale Black, and Jane Davis are in the training program, but also their total number of contact hours.

**6.3.2.3.3 Interactive Multimedia Systems** *Multimedia-based*, interactive learning systems combine the capabilities of many media. The interactive computer feature of these media enables self-paced and self-directed instruction. Because of the sensory input of graphics, animation, sound, and video, multimedia systems match many learners' preferred learning style. Of the two options discussed here, the interactive video tape is no longer a mainstream technology training tool. Learning and reference materials that are CD-based, however, are very popular.

**6.3.2.3.4 Interactive Video** Interactive video combines the capabilities of video with computer-assisted instruction and comes in two formats: laser disk (digital) and videotape (analog). When first introduced, interactive video was revolutionary. For the first time, multimedia was available to enhance Computer-based Instruction. Moreover, rather than having to go through the same set of experiences as everyone else, learners could pick and choose learning modules that fit their needs and skill levels. A major limitation to this technology was the need for special disks and dedicated disk players.

*CD-based Training.* The versatility, costs, and widespread availability of CDs as a delivery format have made interactive video disk technology old hat. PCs almost always include a CD player, and CD products include all the advantages of interactive video with none of the drawbacks, most notably the need for special equipment. CDs can hold incredible amounts of data from a wide variety of media, including text, numbers, audio, video, animation, and graphics. As an instructional delivery medium, CDs can include traditional Programmed Instruction (PI) and Computer-assisted Instruction (CAI) tutorials. However, it is the CD's ability to store vast amounts of data that support multimedia enhancements—audio, video, animation, and graphics—that make CDs so versatile and useful for delivering instruction. The CD is merely the delivery technology. Instructional CDs almost always add animation, video, and sound to the text-based CAL. Authoring software (discussed earlier) enables an instructional designer to incorporate computer graphics, animation, digitized video, still images, and sound into learning programs. Generally, these programs allow information to be imported in various forms from various sources. This information is structured into instructional units, and interactivity is added. Multimedia programs also are used to create presentations. Learning materials based on CDs sometimes emphasize the multimedia entertainment aspects of training. Such courses appeal to end users whose learning style is visual. These courses utilize "books plus" meaning text with enhancements such as short videos or data sets that help the learner more quickly understand or apply the printed material.<sup>1</sup> CDs are found everywhere today, and some are loaded on local area networks and Intranets.

<b>REGISTRAR</b>					
ALL EMPLOYEES WTH LESS THAN 40 HOURSTRAINING (This report does not include people who have not taken any training.) 11/28/1999					
Alvares, Artie	CLASS NAME	START DATE	STATUS	CONTACT HOURS	
COURSE CODE					
EXC100	Introduction to Microsoft	10/11/1999	E	8.00	
ADM16O	Excel	7/16/1999	E	8.00	
ADM1O1	Customer Billing	10/30/1998	F	8.00	
MGT1O9	Procedures	8/27/1999	E	8.00	
VID300	PC Computing	1/1/1999	F	1.00	
	Time Management			<b>Total</b>	33.00
	Stress Management Video			<b>Hours</b>	
Baheri, Ramesh	CLASS NAME	START DATE	STATUS	CONTACT HOURS	
COURSE CODE					
ADM16O	Customer Billing	7/16/1999	E	8.00	
ADM22O	Procedures	7/9/1999	M	8.00	
CLN100	Word Processing	10/11/1999	E	8.00	
MGT1O9	Fundamentals	8/27/1999	E	8.00	
VID300	CPR Training	1/1/1999	F	1.00	
	Time Management			<b>Total</b>	33.00
	Stress Management Video			<b>Hours</b>	
Black, Gale	CLASS NAME	START DATE	STATUS	CONTACT HOURS	
COURSE CODE					
ADM16O	Customer Billing	7/16/1999	E	8.00	
ADM17O	Procedures	9/2/1999	C	0	
CLN100	The Basics of Cost	8/4/1998	F	8.00	
	Accounting			<b>Total</b>	34.00
	CPR Training			<b>Hours</b>	
Davis, Jane	CLASS NAME	START DATE	STATUS	CONTACT HOURS	
COURSE CODE					
MGT11O	Management Leadership	9/27/1999	E	7.00	
ADM22O	Seminar	7/9/1999	E	8.00	
ADM1O1	Word Processing	10/30/1998	F	8.00	
MGTIO9	Fundamentals	8/27/1999	E	8.00	
	PC Computing			<b>Total</b>	31.00
	Time Management			<b>Hours</b>	
E = Enrolled	F = Finished				
C = Canceled	M = Mastered				

**Figure 6-5** Pathlore transcript report. Reproduced with permission.

Most, however, are stand-alone products that are simply “presented to end users, from car mechanics to astronauts, with no instruction in how to use them.”<sup>2</sup> For effective use of CDs as an instructional material, users need training in search strategies and how to navigate the material. Simply having a disk does not mean that the user will intuitively know how to use it. Some companies provide videotapes or audiotapes to demonstrate how to use and navigate an instructional CD.

Figure 6-6 is a listing of CD-based training options for learning Microsoft Office applications. Most are narrated and include screen shots, an index, and a glossary. Programs such as the NETg Inc.’s offering may include an assessment system, quizzes, and simulations.

**6.3.2.3.5 Web-Based Training and Support** Web-based Training(WBT) and support involves learners using the World Wide Web to access learning materials, connect to a wide range of supplementary resources, and have direct communication with their fellow learners as well as the instructor. Other terms that describe this technology are Web-based Learning (WBL), Internet-based Learning (IBT), or E-Learning. WBT is increasingly the distance learning medium of choice. In fact, WBT vendors such as SmartForce predict that in the near future, 80 percent of all corporate education will be delivered via the Internet. While this prediction is lofty WBT has a distinct advantage over CD-based learning as instructional and informational programs can be easily updated and even more easily distributed. When materials are Web-based, the learner can access them whenever he or she has access to the Internet. Moreover, WBT tools are designed to support self-paced instruction as well as live interaction with an instructor and other learners.

Microsoft Excell 2000 Fundamentals	Catapult Inc.	pbt.com
Discover Word 2000	DiscoverWare Inc.	discoverware.com
Excel 2000	Individual Software,	individualsoftware.com
Word 2000 Level 1	Inc.	infosourcenet.com
Microsoft Office 2000 Step by Step	InfoSource Inc.	msspress.microsoft.com
Interface	Microsoft Press	netg.com
Microsoft Word 2000 Fundamentals	NETg Inc.	

Figure 6-6 PC productivity CDs

WBT products, which are typically instructor-facilitated, can support registration, discussion boards, chat rooms, multipoint audio and video, whiteboards, class assignments, interactive quizzes, and even course development. Internet streaming—both audio and video—allows learners to replay educational lectures on demand. A total distance learning solution can integrate other products that support data and/or video transmissions. Software components can include an instructor client, a student client, and a server. Several popular products were listed in Chapter 4 (see Figure 4-12), along with their vendor.

Additionally, training vendors are packaging content along with Internet delivery tools. A corporate training department might choose, for example, to purchase an entire learning solution related to acquiring Microsoft Certification (see Figure 6-8) from any number of vendors, including SmartForce ([www.smartforce.com](http://www.smartforce.com)). Other WBT

providers, such as cick2learn.com (<http://cick2learn.com>), include training on their authoring products via their Websites and Cyberstate University ([cyberstate-university.com](http://cyberstate-university.com)) even has an electronic student union. Moreover, entire WBT learning solutions are available from many traditional universities, including New York University Columbia University and Stanford University which have created for-profit entities that sell complete learning solutions to corporations and educational institutions alike. Most WBT content vendors also provide products via CD-ROM, as well as through the Internet.

An organizing tool for WBT is the portal. Learning portals are Web sites that offer trainees or organizations a “consolidated access to learning and training resources. Portals can range from a simple page filled with hyperlinks to a sophisticated virtual classroom and learning center.”<sup>13</sup> Learning portals can be related to learning resources on a given topic or customized to a given user. Companies, universities (see the following Spotlight), communities, and training consultancies are developing portals. Masie explained that learning portals are hitting the marketplace as a response to e-commerce and appeal to those who like the idea of a single portal for all-world learning.

Although WBT advantages are obvious, limitations may include the need for streaming players, which are platform specific and must be downloaded, although most are available free. Additionally, most support either Windows or Macintosh.

### **SPOTLIGHT ON SOLUTIONS →Technology, People, Structure,**

#### **NEW YORK UNIVERSITY INTRODUCES NYUHome**

NYUHome is a portal a door to many web-based services and tools. Using Netscape or Internet Explorer, you will be able to access your e-mail, Albert account [registration and transcript service], web forums, classes, research tools and more, bringing together all your Internet needs in one web page. Your NYUHome page is customizable, and can be adapted by you to fit your needs and interests. Different services and information, such as reference searches or a schedule of campus events, are provided through channels, and you can choose which channels you want to display on your page.

NYUHome will provide greatly enhanced e-mail, with ten times the current quota for e-mail and a built-in web based e-mail client. This new service lets you access your e-mail from anywhere in the world with web access. Because your messages are stored on the server, you can work on e-mail from an office workstation, a home computer, a laptop in a hotel room or a public terminal, without having to transfer files between computers. In fact, all of NYUHome is designed for global access. You can go Home no matter where you are.

*Source:* Marilyn McMilan, NYU Chief Information Officer, e-mail to the NYU community on April 20, 2000.

However, most organizations are platform specific and can overcome these limitations easily, allowing learners to have several senses engaged in the learning process through the Web.

**6.3.2.3.6 Advantages and Disadvantages of Computer-Based Training In short,** Computer-based Training programs can include media at many levels of interactivity that incorporate text, audio, and video. CBT systems conform well to several principles



of adult learning. For example, CBT ensures that trainees are able to proceed through the lesson at their own pace. Training is time-independent; trainees need not adhere to a rigid time frame. Training is done independently of an instructor; the student guides the lesson. Although computer-based media vary in interactivity~ the learner always is active in the learning process. Moreover, such training is fiscally sound as training can be done just in time.

The list of drawbacks to CBT typically begins with its development expense, which is followed closely by its perceived lack of personal touch. Such costs involve the author (the person who codes screen layouts, interactivity, test questions, etc.), the content expert (the expert in the subject matter to be taught), and the instructional design expert (the person who understands learning theory and how it is applied to the skills and concepts being taught).

Costs to consider with the development of an interactive, multimedia CBT program include the authoring system; the course designer; the script writer (the person who writes the audio and video sections of the program); and the film/video producer, actors, and actresses (individuals who produce and perform in the production). In addition, if the delivery is by CD, the CD must be pressed (this includes costs associated with producing the disk itself); otherwise, the time and expense involved with streaming technologies must be considered. Web-based distribution decreases this latter cost significantly. Recent cost figures for developing CBT range from \$150/hour to \$500/hour, depending on the quantity and quality of the medium.

Although CBT development expenses can be high, they are often cost justified by showing per-person or marginal costs. Per-person costs spread the expense of production over the number of trainees expected to benefit from the training. Marginal costs are the expenses of adding a trainee—.in other words, the expense, once the disk is produced, to train yet another person. Other disadvantages include the necessity that the trainee often operate more than one piece of equipment and the scarcity of well-written, job-applicable, off-the-shelf programs. However, with the advent of the Web as a delivery medium, instructional systems can be updated and distributed easily. Just-in-time availability of learning makes the Web a delivery option of choice. Figure 6-7 summarizes advantages and disadvantages of various types of Computer-based Training.

**6.3.2.3.7 Audio- and Videotape-Based Training** Today in many bookstores, audiotapes and videotapes sit on shelves alongside the books. While such media are not in contention to replace books, they are alternative forms for information dissemination. Audiotapes and videotapes sometimes supplement paper-based training manuals. Some trainees consider such media more personal than a book; others explain that audio or visual cues illustrate or explain things in a manner that a book cannot. Whatever the reason, the use of such media for training is growing. The following example illustrates the use of audio and video-based training delivery:

Company RST has just installed workstations on the desks of its mid-level managers. Although the managers have been using personal computers for some time now, they are suddenly introduced to a wide range of new applications, including database management. The organization has in stock a number of VCRs, and its approach to training is to lend a VCR and training video to any manager who requests it for a period of one week.

APPROACH	COMMONLY USED WHEN	ADVANTAGES	DISADVANTAGES
Computer-assisted Instruction	Content is stable; Actual situations need to be simulated	Portable learning materials	Development time and costs high
Computer-managed Instruction	Recording of learner performance is important	Provides learners with assessment and recordkeeping	Protecting test banks; Must be linked to other learning resources
Interactive multimedia	Large numbers of dispersed learners exist to offset high development costs; Content is stable	Appeals to multiple senses; Portable learning materials	Long development time; High expense; User must be motivated and trained to use
Web-based Training	Audience is large and dispersed; Content needs continuous updating	Universal language; Easy, affordable distribution; Content easily updated; Affordable technology	Need for technological infrastructure bandwidth and cabling; Ensuring learners do their own work

**Figure 6-7** Advantages and disadvantages of computer-based training approaches

Audio and video add a human element to self-paced training. Video goes a step beyond audio in providing visual information—demonstrations and examples that aid the learning process. In addition, such media enable trainees to learn at their own pace and convenience. Besides the problem of ensuring high-quality audio and video learning packages, other problems include maintaining the trainee's interest. Also, quality training programs are expensive to produce and buy. Costs to produce an in-house, application-specific video, for example, may range from \$5,000 to \$100,000. Prices for ready-made videos typically begin at \$100.

**6.3.2.3.8 Hands-On Workshops** Workshops are training sessions in which a facilitator guides the trainees to use technology. In a workshop situation, trainees learn and use skills through hands-on exercises, in which they also can learn from each other. The following example illustrates the use of workshops to deliver training:

The organization has subscribed to the DIALOG database for years. Despite its known benefits, however, few people seem to be using it. Roger Deveau, training director, invites managers and professionals to attend a 2-hour workshop to review principles of data retrieval and share ideas on how the system could be used in the organization. Roger uses exercises to review how Dialog works, and the group then proceeds at its own pace, with Roger offering one-on-one help and participants helping each other when appropriate.

Advantages to using a workshop approach to training are that learners get hands-on training using software features with immediate practice and application on (hopefully) examples similar to their own needs. The best workshops give learners a chance to bring at least one of their own applications to work on.

#### 6.3.2.4 Manuals and Job Aids

Beginning the “refreeze” stage, where using the system becomes automatic with the way work is done, are manuals and job aids. These tools serve as references or reminders for completing tasks.

Manuals, which also are referred to as *system documentation*, are a written description of how a system operates and are a vital component of any system. Because a reference manual is comprehensive, individuals may need to know something about a system before they can even understand how to use the index. This is because programmers often are more concerned with what the program can do than in being able to explain how to use it. On the other hand, experienced users often can use a manual to teach themselves on a need-to-know basis.

Although manuals are valuable references for experienced users, they are seldom good learning tools for the novice. Well-written documentation does exist for some programs, but manuals rarely are recommended for initial training. Only if the manual is accompanied by an interactive tutorial and a motivated learner are manuals effective for training novices. However, used appropriately, manuals provide backup that allows experienced users to troubleshoot their own problems.

For specifics on how to complete a given task, job aids are useful. Job aids can be simple procedure lists or templates to which a user can refer easily. The operative word is *easily*. Rather than having to check indexes and read the manual materials, these simple aids provide a summary of functions and procedures. Even the most experienced user of Word or Access, for example, can find a list of frequently performed functions reassuring.

#### 6.3.2.5 Coaching

Coaching, one-on-one training, is effective but a costly method of training delivery. Its effectiveness stems from direct interaction between trainee and trainer, so concerns and problems are addressed immediately. The trainee does not have to spend time reading manuals or trying extensive trial-and-error approaches. It is often difficult to justify monopolizing the time of a trainer with one person when, in a classroom situation, a trainer can teach 10 to 15 people. However, coaching maybe the best approach in selected situations, such as for executives and specialists whose time is limited and expensive, for highly specialized applications or skills, and for resolving problems.

Coaching has long been recognized as the most effective way for adults to learn. It entails direct and immediate interaction between trainer and trainee. In such a situation, trainees get personalized feedback throughout the learning experience, and they proceed at their own rate of learning. The following example illustrates the use of coaching to deliver training:

When Edward Thomas began his new job as manager of the loan department at City National Bank, he needed to learn how to use the bank’s customer databases. Because the databases were online and available for verifying customer records, they would be an asset for him. Ed’s supervisor spent an afternoon with him going over access codes, key words, and what to do when problems arose. Ed’s intensive training enabled him to learn the system easily and quickly.

### 6.3.2.6 Seminars

“Lecture only if you must.”<sup>14</sup> This advice is offered frequently by people interested in training results. Lecture is a traditional classroom approach to learning and usually involves an individual trainer giving information to a group of trainees. The trainees typically listen and take notes in an effort to understand and remember the information. The following example illustrates the use of seminar as a method of training delivery:

#### **COLLEGE KIDS COACH BUSY BANKERS**

Tech trainers at investment firm Morgan Stanley Dean Witter are using part-time college students to bring coaching straight to end users’ desktops.

That’s because when the trainers held past classes, no investment bankers came. “They don’t like to leave their desks. They don’t really find training that important. They think it’s very important that if a customer calls, they’re available,” says Shannon Lally, who works in the user technology training group within MSDW’s information technology training department.

The coaches circulate though the I-banking department answering questions and teaching end users how to use applications, which are mostly MSDW proprietary software. The young semi-trainers also help end users connect up with Help Desk staffers who can answer more complicated questions and fix hardware and software breakdowns.

Since it began in 1995, the program has grown to cover eight departments in addition to I-banking. “It became really popular,” says Lally. She says that when a coach arrives at an employee’s desk, the employee frequently has a handful of sticky notes with questions.

The training department has brought 19 coaches on board. Lally and her colleagues recruit the students from placement offices at New York City colleges and universities—many are MBA students. In addition to the on-the-spot coaching, they build Web pages, create hand outs and quick reference cards, and even teach some classes.

Lally says the program has spared the training department the cost of hiring some professional trainers. And the appeal of the coaching program is pretty universal, Lally says. “Whenever I tell people about it, they always say, ‘I wish I had a coach, too.’”

*Source:* Reprinted with permission from April 1999 issue of *Inside Technology Training* magazine. Copyright 1999 Bill Communications, Inc. Minneapolis, MN. All rights reserved. Not for resale.

Company DEF, with a network of personal computers in place, trained its supervisory people on new software designed to report performance appraisals. The new system could tabulate scores and help the supervisor identify recurring problems or trends. It also could plot an employee’s progress from quarter to quarter. Because the system needed to be operable within two weeks and because the supervisors were centrally located at the organization’s headquarters, the seminar, combined with demonstration, was deemed the most appropriate mode of training delivery.

The term *seminar* is used here to describe learning experiences that may include a mini lecture, but are small enough to include opportunities for trainees to interact with the lecturer and with each other. The advantages of the seminar are that such a learning experience is easy to establish, trainees are familiar with the lecture method, and it is an effective way to disseminate information to groups of people quickly. Seminars are effective when the seminar designer provides ample opportunity for trainee interaction. Research has shown that when individuals leave a traditional lecture, they retain only 25 percent of the material to which they were exposed. Seminars are most effective when they are combined with other strategies such as a demonstration or hands-on training.

### **6.3.3 Group Learning and Support Strategies**

In addition to training for new systems and identified business needs, organizations may offer various other educational programs to promote and support the effective use of computers in the workplace. Some of the most commonly used are discussed in this section.

#### **6.3.3.1 Computer Fair or Expo**

“The [insert the name of your state, e.g., Indiana] State Fair is an opportunity for [insert the nickname that describes people in your state, e.g., Hoosiers] to display their latest developments—agricultural, industrial, technological—to the rest of [insert the name of your state again].” This is also the purpose of a computer fair.

Such an event may be similar to a state fair or national conference, such as the annual Federal Office Systems Expo (FOSE) in Washington, D.C.; the annual INFO show in New York City; or the semiannual COMDEX Show (Fall, Las Vegas; Spring, Atlanta). At these events, vendors display their latest hardware and software developments. These events also feature talks by leaders in information systems planning and management. Topics typically include developing standards, implementation techniques, training, and industry forecasts. Workshops for users are often included. These events provide an opportunity for information sharing and learning.

Likewise, a computer fair held in an organization can be a forum for information sharing and learning. On a less grandiose scale, a company-based fair can provide an opportunity for EUIS to display hardware and software that are available to end users. In addition, a seminar, presentation, or even roundtable discussion can increase user acceptance of new technologies. Such forums also provide an opportunity for users to communicate individual needs and concerns to planners.

#### **6.3.3.2 Advisory Council**

An advisory council is a select committee that offers advice to the EUIS analyst or task force regarding technology and information-related concerns. An advisory council typically is created after the fact. With the new technology in place, a council may monitor the implementation of the current project and perhaps help the systems analyst develop new products or identify training requirements. Like any advisory council, it is composed of individuals at the upper levels and in user departments who have a vested interest in the success of the project. Success of the council rests, in large part, upon its membership and the ability of the EUIS analyst to listen and respond to its suggestions.

#### **6.3.3.3 Newsletters**

Newsletters and internal newspapers (often called house organs) are part of the organizational culture of most large companies. Newsletters typically are written and disseminated by a human resources department and offer updates on company policies, news about business performance and company events, and personal notes about employees (promotions, transfers, marriages, etc.).

The EUIS analyst can use such newsletters to disseminate information about plans, new products, an upcoming fair, users' groups (discussed later), and so on. As an alternative, many EUIS groups write and disseminate their own newsletters. Either way, a newsletter can be an effective way to reach everyone in the organization with news of

technology plans, new products, training programs, and success stories in which end-user computing has been well accepted.

#### **6.3.3.4 Internal Consultants**

*Internal consultants* are full-time employees of the organization. An internal consultant is available to company employees on an ongoing basis to aid with information processing needs. Consultants perform a variety of roles. They may provide technical expertise to analysts, provide planning expertise to managers, or fulfill other high-level roles. They may aid end users in applying information technologies to their jobs or departments. The internal consultant offers individualized support that is often extremely important to implementation. The individual may work within the EUIS department or be a member of the information center staff.

#### **6.3.3.5 Information Center**

The information center is a focal point for supporting the use of computers by non-technical personnel. The center is a place where users can go for help in learning new programs or developing new applications. An information center usually includes a Help Desk for quick response to questions or problems (see chapter 7). The information center can provide the tutoring and expertise users need in applying new computer technologies on the job. Employees who know where to get additional training and help in using technologies are less resistant than employees who feel left on their own.

#### **6.3.3.6 User Groups**

User groups are informal groups of users of computers or other technologies who meet to exchange expertise, experiences, and problems. Members usually are highly motivated and skilled individuals who want to share and learn techniques related to technology. User groups were first formed by users and supported by vendors of software products. IBM, Wang, and Goal Systems (CBT software and online reference) all supported very active user groups, including national conferences with many hundreds of users. As an organizational learning strategy, it supports users sharing—and learning—with each other.

Many cities have metropolitan users' groups, and organizations may sponsor members. What is becoming more prevalent, however, is that organizations sponsor user groups within the organization. Often over brown bag lunches, users discuss successes and problems. User groups are extremely motivational in fostering not just more use of new technologies, but more creative uses.

#### **6.3.3.7 Professional Organizations**

Professional organizations such as the American Society for Training and Development (ASTD), the Association of Information Technology Professionals (AITP), and the Organizational Systems Research Association (OSRA) provide a source for information systems professionals to learn about new developments in information technologies and what is happening nationwide and in their communities. Such networks enable individuals to participate in seminars, presentations, and conferences on topics related to effective technology application. This networking—meeting others with similar concerns, problems, and new ideas—offers many benefits, such as learning how another

organization handled a particular situation. A more complete list of information processing professional organizations appears in Appendix 1.

## **6.4 IMPLEMENTING SUCCESSFUL PROGRAMS**

No training method will work unless the learner is convinced that the skill to be learned is useful to him or her back on the job. To this end, it is important that a learner's preferred learning strategy be supported as much as possible. An effective training initiative will match the right content to the right learners—those that have a need to know—and in the right way. Moreover, effectively learning to apply technology typically calls for more than one approach to learning. And when live instruction is the solution, just as important as targeting the right learning audience is finding the right instructor(s) for the learning program.

### **6.4.1 Checklist for Choosing Instructional Strategies**

The trainer must choose from a variety of methods and media for meeting training needs. Likewise, delivery includes a variety of strategies. Answers to the following questions can be used to develop criteria for appropriate instructional strategies:

How many people must be trained? Where are they located?

What is the current level of trainee expertise?

How complex is the learning?

How soon do people need to be trained?

What methodologies have been successful in the past?

What facilities are available?

Are training materials available or must they be developed?

### **6.4.2 Selecting Training Participants**

Selecting the right training participants occurs in the assessment stage. Perhaps the most important rule is that the trainees selected for the learning activity should have a need to know; in other words, they should be able to apply the skills they are going to learn directly to their jobs.

Another consideration is how workers should be grouped for the training. It is not always practical to group people solely on their need to know. Other considerations are the current skill levels of trainees, their organizational levels, and the skill levels required (performance objectives). For example, putting novice and advanced spreadsheet software users together to learn a newly adopted version of the software is not recommended.

Grouping individuals with different learning objectives also poses problems. Some individuals may need a thorough working knowledge of all software features, while others may need just a general overview of capabilities and applications. Also, when managers and subordinates are grouped together for the same learning activity, an even split of managers and subordinates is suggested.

### **6.4.3 Selecting Training Instructors**

EUIS workshops and seminars, as well as support materials, may be developed and/or delivered by the technology vendor or a vendor's agent, by an outside consultant or firm, or by an internal trainer.

#### **6.4.3.1 The Technology Vendor as Trainer**

Most EUIS equipment and software vendors include training in their customer support offerings. Vendor training can range from a demonstration of how to use a printer to a five-day seminar on Intranets. Training often is included in the vendor's proposal to sell and install the new system. It is expected that the vendor has the most expertise in using its products and a vested interest in ensuring that the equipment is used effectively.

When a large system is new, a vendor often provides complimentary basic training for one or two people at no charge. Courses for additional persons or for advanced skills are then made available on a fee basis. Although courses are sometimes offered at the customer's site, many courses are available only at the vendor's facility. IBM, for example, offers a multitude of seminars. IBM's courses are offered at various instructional levels, from novice to highly technical. A fee is charged for some IBM courses, others are free.

Some vendors have developed training courses and materials that can be purchased by the customer for in-house trainers. In effect, a vendor may offer purchasers a course to train the trainer. In addition, vendors often offer Web-based tutorials, reference manuals, or other learning aids for their products.

Most hardware and software vendors, such as Dell, Gateway, IBM, Microsoft, WordPerfect, and Intuit, have customer hot lines. Using a toll-free number, purchasers can call for online, expert assistance. The use of such hot lines is not intended for training; rather, it offers support for problem resolution. In addition, vendors often establish user groups.

However suited vendor training may be to learning specifics of a system, it does not always meet organizational or individual needs. The type or amount of training available may not be appropriate for the particular individual or group. This lack of control over content and delivery options may not result in the desired learning outcomes.

A relatively recent development are certification exams that certify that individuals have a specific skill set. These routes can be categorized as software, hardware, or networking, and are described in Figure 6-8.

#### **6.4.3.2 The Outside Consultant as Trainer**

An outside consultant usually is used when an organization does not have the expertise or resources (time, staff, materials) to develop a training program for an identified need. When an organization chooses an outside consultant to conduct the training, they commonly select a trainer who was involved in the initial needs assessment. At other times, the assessment was done internally, and a consultant is hired to develop a program to address the identified training needs.

When choosing an outside training consultant, the planner should check the reputation of the consultant, ensure that the consultant knows what outcomes are expected, and continually follow up with the consultant. Because the training planner is accountable for the learning experience, continuous evaluation of the classes being conducted is advised.

An example of a training vendor (not a technology vendor) that offers a variety of training and support services is the Masie Center. Described as an international think tank focused on learning and technology, the Center (<http://www.masie.com>) offers public and customized seminars. Additionally, the Center cohosts Tech-Learn, an annual



conference that brings together leaders in the field to discuss new technologies and learning issues. A compendium of materials from their meetings is available on CD, as well as through the Internet. Their Web site also includes links to other resources such as news releases and recent articles and books.

#### **6.4.3.3 The Outside Educational Institution as Trainer**

Many organizations offer tuition reimbursement programs to employees who take job-related courses or attend seminars outside the organization. In such cases, the training planner has virtually no control over course content. However, institutions generally publish performance objectives and content outlines, which the training planner can use to select courses or seminars that fit the overall training strategy for learning new systems or applications. The major disadvantage of courses provided by outside institutions is that they are general in nature, and trainees must sift through the information to select what

##### **SOFTWARE**

Many certification exams are available for applications software packages (spreadsheets, database management systems, word processing, and presentation graphics). The Microsoft Office User Specialist (MOUS) certifications cover popular applications. For most applications, more than one certification (core and expert) is available. In addition, operating system software certification, e.g., Windows 2000, involves operating system basics and various levels of server technology.

##### **HARD WARE**

More than 120,000 professionals hold the **A+™** Certification, which assesses desktop computer service and repair technology skills. The exam is developed and administered by the Computing Technology Industry Association (CompTIA), an association representing over 7,500 hardware and software firms. While the certification is designed for hardware technicians, it is considered valuable for anyone who will support computer end users.

##### **NETWORKING**

Microsoft Corporation, Novell Corporation, and CompTIA offer certifications that deal with computer network technologies. Network+™, a product- and vendor-neutral certification, is the most recent certification examination to be developed by CompTIA. Novell and Microsoft certifications require expertise in vendor-specific networking software/hardware solutions

The following sources provide excellent information about certification. Specific URLs for the Web sites may change from time to time, so conducting a Web search may be necessary to locate Internet resources.

*www.certification.com.* This site, sponsored by about.com reviews publications, offers current news, and presents dozens of vendors, training providers, salary surveys, and general information about computer certification

*www.certifiedcomputerpro.com.* Primarily links to certification-related sites, this site contains links to news groups. Its Certification Program Counts section lists the number of people certified in each program.

*www.gocertify.com.* An Earth Web site, this resource organizes information by certification vendor and by topic. Its Reading Room links articles and white papers related to certification.

*www.comptia.org.* This is the site of the Computing Technology Industry Association, the organization that develops A+ hardware and A+ networking certification examinations.

*Source:* Ray, Charles M. and McCoy, Randy. (2000), "Why Certification in Information Systems," *Information Technology, Learning, and Performance Journal*. (18)1,1—3. Reprinted with permission.

**Figure 6-8** Software, hardware, and networking certification routes

applies specifically to their job environments. Trainees also must take the initiative to acquire practice on the job and apply the skills they have learned.

On the other hand, when trainees go outside the organization for training, they have opportunities to exchange ideas with others. This aspect persuades organizations to sponsor employee participation in organizations such as the American Society for Training and Development (ASTD), the Association of Information Technology Professionals (AITP), or the Organizational Systems Research Association (OSRA).

#### **6.4.3.4 The Internal Trainer**

Internal trainers may work full time at training or be practitioners who have part-time training responsibilities. Trainers often develop expertise in certain areas of instruction (e.g., word processing, database management, graphics) and plan and conduct all courses in their specialty. Many large organizations have extensive internal training programs to meet business, technical, and office computing needs.

An internal training staff assures the organization of good, consistent training. Most importantly, it provides efficient training because programs can be tailored to specific business needs or project objectives. In addition, large organizations can provide internal training at a low cost per trainee. However, trainers may become too narrow; they may determine that their expertise is always needed, or (like some teachers) they may become too rigid in their plans.

Advantages and disadvantages as well as costs must be considered by any training manager. For example, for special requirements or small organizations, it may be less expensive to hire a \$1,200-a-day expert to conduct the training than to pay an internal trainer to learn the content, then plan and deliver the course.

#### **6.4.4 The Training Plan**

Plan the work and work the plan. Planning the training experience entails defining the performance objectives and knowing what needs to be taught and to whom. The complexity of the material or skill to be learned and the abilities of the trainers are taken into account as the designer puts together an instructional program and follows it through to completion. The designer also should ensure that the training program is given adequate time and priority.

A training plan may be simple or complex depending on the requirements. A plan to develop proficiency with a single software program in one department may be fairly straightforward. A training plan to support a large reengineering project could be very comprehensive. It could easily involve dozens of training requirements for hundreds of users at all levels of the organization, geographically dispersed, over an extended period of time with a budget in the millions of dollars.

Technology is often underused because practitioners do not know how to use it to the fullest, and this means training and on-going support strategies are considered. Dissatisfied users often complain that insufficient time is spent in classroom training, course content is complex, and training manuals are difficult to understand. Users also report a need for training that is more practical than theoretical and for training that focuses on how they could use the system.<sup>15</sup> Follow-up training sessions, users' groups, and a newsletter for sharing ideas should always be part of the plan.

## 6.5 EVALUATING TRAINING PROGRAMS

Evaluation is the fourth stage in the training cycle, yet is a continuous process. Although evaluation is time consuming and can be costly, its role in ensuring that the right things are done at the right time with the right learners in the right priority order is invaluable. Planning evaluation strategies should take place prior to the design stage, as evaluation criteria will be benchmarks for determining whether or not program goals were met. The overall goal of evaluation is not to label a training effort as good or bad; rather, its goal is to determine what went right and what went wrong, and learn from those experiences. Despite knowing the value of evaluations, training evaluation is not always done. Reasons abound. Deadline pressures, projects that are considered too big or too small to bother with, and an attitude that it's always been done it this way are given as reasons (excuses). Training evaluation, however, is important and should be done at least from time to time. The first step is to determine what should be evaluated, or the evaluation criteria.

Criteria are measures of success that can be used to determine whether or not the objectives of the training program were met. Donald Kirkpatrick, the guru of training evaluation strategies, has identified four domains, which are categories of similar ideas or thoughts, that can help planners determine what they intend to evaluate. These are reaction, learning, job behavior, and organizational results.<sup>16</sup> A fifth domain, process, is also an important consideration (see Figure 6-9).

*Reaction* refers to the learner's perception of the value and appropriateness of the training efforts, including course design, the instructor's performance, and whether or not the learning activities met their expectations. Adult learners are resources to effective training design as well as its target; their feedback can be invaluable to training designers. The most common strategy to obtain reaction data is an end-of-the-program survey, often referred to as a smile sheet, because instructors sometimes use such a survey to get feedback on how well they (the instructor) did, and feedback usually makes them smile.

Evaluation strategies to assess *learning* include tests, demonstrations, role plays, portfolios, or other performance outcomes. Learning is the overall objective of any training effort. Although tests are much more common in academic settings than organizational settings, test data can help the designer or instructor determine where the program's strengths or limitations are. Testing in an organizational setting is almost never used to assign grades. Increasingly, performance-based activities are used to assess whether or not learning occurred.

*Job behavior* refers to a category of evaluation techniques designed to determine whether or not the skills learned in the training activities were applied back on the job. One way to make this determination is to survey learners or their managers two weeks, two months, or even a year after the training effort to determine their perceived usefulness of the training. As with all evaluation data, it is important that those who are asked to evaluate job behavior know that data will be used to evaluate the training program, not their job performance.

The most difficult evaluation domain to evaluate is *organizational results*. The primary question asked here is how training efforts match the larger goals of the

organization. The goal is to link any improved learner performance to soft (improved morale) or hard dollar outcomes (increased sales, lower error rates).

*Training Process*, the evaluation techniques that describe the training cycle itself, extends Kirkpatrick's domain list<sup>17</sup> and is added here as a fifth domain. Data from these techniques are used to assess or audit the training department. Because a learning organization has a goal to learn from its successes as well as its failures,

- Reaction
- Learning
- Job behavior
- Organizational results
- Training process

**Figure 6-9** Five domains of training evaluation criteria

documenting which training efforts work and which do not work in a given organization is useful to training professionals. Because training can be delivered in more than one way, can we determine what the *best* way is?

In developing evaluation strategies, it is useful to keep in mind who is interested in the results of the training assessment—top management, supervisors, systems developers, or the training director. Top management may want data that justify the costs of training (organizational domain). They may want to know whether trainees were able to apply what they learned to their jobs (job behavior domain) and to what degree performance was improved (job behavior domain). The systems developer will want to know if the system was easy to use (learning); evaluation data could be used to redesign screens or keystroke sequences. The supervisor will want to know if the user is able to perform a specific task (learning). The training director will want to know if training was done the best way possible and whether trainees considered the training experience valuable (process domain). The trainer may want to know whether trainees were pleased with the specific delivery of the workshop (reaction). Figure 6-10 illustrates several reaction evaluation forms—midpoint reaction, workshop rating, and courseware evaluation.

## 6.6 SUMMARY

Technology is useless unless it is used, and using it requires training. Training for EUIS encompasses learning needed skills, understanding why the technology is used, and most importantly discovering how to apply it on the job. Training for EUIS will increase in importance as users are trained and retrained to use new technologies, as the use of desktop computers grows, and as the number of knowledge workers employed in offices continues to increase. Moreover, employment trends show that skill requirements will continue to change.

This chapter took an action research approach to training programs—assessment, design, implementation, and evaluation. Organizational, task, and individual assessment helps the training program designer understand exactly what the

<b>TRAINING PARTICIPANT REACTION FORM</b> <b>—Midpoint Evaluation—</b>	
<p>At this point in the training program, you understand the purposes and procedures of your classroom experiences. Please take a few moments now to share your reactions with me. I will use the information from these forms to make the remaining sessions as valuable to you as possible. Complete the following sentences:</p>	
<ol style="list-style-type: none"> <li>1. To date, the topics I have valued most in this program are</li> <li>2. To date, the topic(s) I have valued least in this program are</li> <li>3. The method of instruction I prefer is</li> <li>4. The method of instruction I least prefer is</li> <li>5. The next time the instructor teaches this material, I suggest</li> <li>6. The instructor should emphasize the following in the next sessions</li> <li>7. I suggest we discontinue doing</li> <li>8. Overall, this program has been</li> </ol>	

**Figure 6-10** Typical training evaluation forms

<b>WORKSHOP RATING SHEET</b>	
Participant # _____	
Rate each of the following on a five-point scale:	
<ol style="list-style-type: none"> <li>1 = Disagree strongly</li> <li>2 = Disagree</li> <li>3 = Neutral</li> <li>4 = Agree</li> <li>5 = Agree strongly</li> </ol>	
1. _____ Presentations were well organized. Comments:	
2. _____ Trainer used appropriate visual aids and used them well. Comments:	
3. _____ Trainer chose appropriate methodology for instruction. Comments:	
4. _____ Trainer knew the subject matter. Comments:	
5. _____ Entire course design was appropriate for skills/concepts. Comments:	
6. _____ Trainer's overall presentation style was good. Comments:	
Topics/activities most valuable:	
Topics/activities least valuable:	

**Figure 6-10** (continued)

training program is to accomplish, who the target audience is, and how results of training will be applied on the job. Assessment is considered a critical stage. Identifying what needs to be learned by whom should be determined up front. To conduct a needs analysis, the training program developer can use interviews, questionnaires, observations, or focus groups. The purpose of such inquiries is to determine whether training could result in improved performance.

Basic to designing effective training programs is knowledge about how adults learn. Although the terms *pedagogy* and *andragogy* have roots that are related to the age of the learner, the terms refer to strategies for specific learning needs based on the experience of the learner. Pedagogy means teacher-directed learning experiences that are structured, making the instructor responsible for learning results. Andragogy, on the other hand, is learner-directed training and requires the learner to be responsible for learning. Adult learners tend to prefer hands-on learning that they can apply to their work immediately. They tend to be self-directed and prefer to work at their own pace. Generally, they like to have control over their learning environment.

With knowledge of who needs to learn what, the next step is to identify specific learning strategies. This chapter examined training and support as part of an

COURSEWARE EVALUATION FORM					
Following is a list of courseware used in this session. Please rate each item as to its overall quality as well as the overall impact you believe it had on your comprehension					
Quality scale:					
N/A	Confused me!	poorly done	neutral	nicely done	superb!
0	1	2	3	4	5
Comprehension scale:					
N/A	Confused me!	of no help	neutral	of some help	of great help
0	1	2	3	4	5
Book	Quality: -----		Comprehension: -----		
Comments:					
Handouts	Quality: -----		Comprehension: -----		
Comments:					
PowerPoint slides	Quality: -----		Comprehension: -----		
Comments:					
Videotape	Quality: -----		Comprehension: -----		
Comments:					
Peer tutoring	Quality: -----		Comprehension: -----		
Comments					

**Figure 6-10** (continued)

implementation and learning support system. Thus, the overall goal of training and support activities is to ensure that the target population is ready to learn (motivation or “unfreezing”), uses appropriate methods to learn (instructional strategies or “moving”), and that use of the new skills meshes with the way work is done and becomes the accepted way of doing tasks (ongoing support, or “refreezing”).

Specific strategies to ensure that learners are motivated to learn, really do learn, and apply what they learn back on the job were classified here as supporting individual or group learning. Individual learning and support strategies include brochures and promotional pieces, demonstrations, tutorials (print-, CD-, or Web-based Training) and hands-on workshops. Web-based Training, because of the ease and low cost for delivering training, is a fast-growing option. Ongoing individual support activities include manuals and job aids, coaching, and seminars. Group learning and support strategies include computer fairs, advisory councils, newsletters, user groups, and professional organizations.

Experts agree that the choice of instructional strategy depends upon the complexity of the skill and knowledge to be learned, the current expertise of the learner, how many people need to be framed on a system, the time frame for learning, and individual learning styles. With answers to these questions, the training designer can choose one or a variety of methods for doing the training.

Evaluation answers the question, “Did the training program do what it was expected to do?” Evaluation reports need to address the concerns of who has requested them. Top management, supervisors, the systems developer, the training director, and the trainer may all want an evaluation of a training effort. Evaluation, the final stage of the action research model, employs the same techniques as the needs assessment.

In short, the key to successful systems implementation is to see that end users are trained and supported. Training is continuous, not a one-shot, ad hoc effort. As organizations become more and more reliant on technologies, they are investing more and more company resources in seeing that workers can use the technology. EUIS experts recommend that dollar investment in training and support match dollar for dollar the investment in technology. Training should be done for the right things and for the right people in the right way in the right priority order. Training should be allotted adequate time and resources. Systems framing is continuous (it never ends!). The next chapter, “Support and Help Desk Management,” overviews those learning and support services that are typically part of an Information Systems Department in large organizations.

## KEY TERMS

- Computer-based Training (CBT)
- Individual analysis
- Interactive multimedia systems
- Organizational analysis
- Organizational culture
- Task analysis
- Training needs assessment
- Web-based Training (WBT)

## **DISCUSSION QUESTIONS**

1. Discuss the role of training in implementing EUIS.
2. Distinguish between andragogy and pedagogy~
3. What is the purpose of assessment? Why is assessment the most critical step in designing training programs? What are some of the key questions to be asked when assessing training requirements for a new EUIS installation?
4. Draw a picture of the person who will be sitting down at the computer to use your training package. Include facial details and the work area. What does this picture tell you about instructional design needs?
5. List learning and support strategies commonly used to ensure a successful systems implementation. Which strategies are used at the (1) unfreezing stage, (2) moving stage, and (3) refreezing stage? Which strategies are aimed at an individual learner? Which are aimed at learners in groups?
6. What circumstances lead organizations to develop training programs themselves, rely on the system developer, or hire external consultants to provide training? Give an appropriate training situation for each alternative.
7. What is the purpose of training evaluation? Why is it important? Using the five domains of training evaluation discussed here, discuss how one would go about determining what to evaluate, as well as who would be interested in the results.

## **APPLICATION EXERCISES**

1. Select a microcomputer software program, such as a bibliographic management, spreadsheet, or presentation graphics package. Conduct a needs analysis among your classmates and design a training program to teach the package to them, including a means for evaluation. Conduct a training session to teach the first part of your program, demonstrating the software to the class, and have the class evaluate the presentation.
2. Visit the Web site of Blackboard, Inc. ([www.blackboard.com](http://www.blackboard.com)). At the time of this writing, they offer a free, 30-day trial shell of their distance learning software. Download the shell and use it to support the course you developed in exercise 1.
3. Investigate the training program for EUIS provided through the computer center (or other facility) on your campus. Interview the director or an instructor in the center. What courses are offered? How are the courses taught? How was the appropriate content for courses determined? Evaluate the center's training offerings in light of what you learned in this chapter.
4. Talk with someone you know who works in an office to find out about the training programs offered in his or her organization for EUIS. If possible, obtain samples of course offerings, internal newsletters, or other information about the program. Has your interviewee participated in any of the computer training programs? How does he or she evaluate the experience? Summarize your findings in a report or organize them for presentation to your classmates. Compare your findings with the findings of other students.



5. Obtain tutorial software programs for popular PC packages. Try them out and evaluate their effectiveness in helping first-time users learn to use the software programs.

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