SECTION 1

An Introduction to the Technology of Training

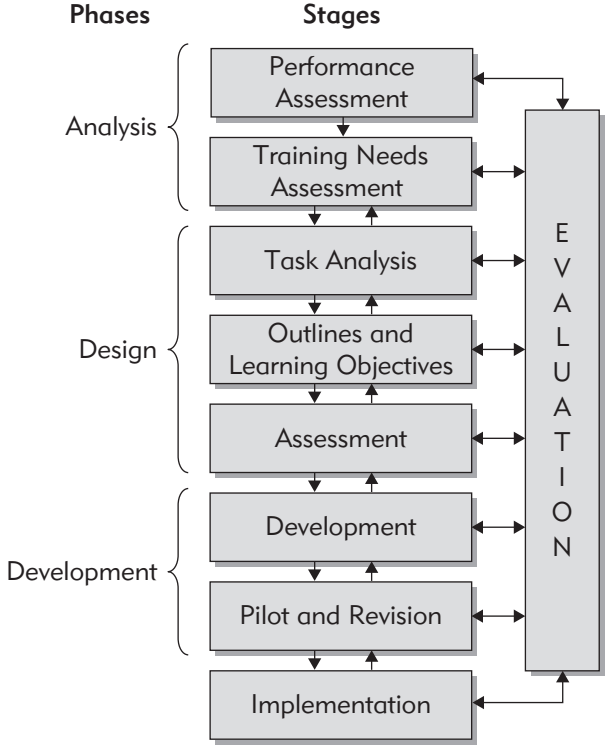
Chapter 1: The Technology of Training

Provides an overview of the instructional systems design (ISD) process and introduces the four basic components of all training programs: the content, the objectives, the instructional methods, and the delivery media.

Chapter 2: An Introduction to Structured Lesson Design

Introduces the general structure of a lesson and the content-performance matrix. Provides the rationale for documenting the key instructional methods in the learning materials.

Figure 1.1. An Instructional Systems Design (ISD) Process



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The Technology of Training

AN INTRODUCTION

CHAPTER OVERVIEW

An economy dependent on design, engineering, analysis, and service—in other words *on knowledge work*—cannot afford ineffective or inefficient training. Training with organizational payoff won't happen by accident. It requires a systematic approach to analyze requirements, define instructional ingredients, and create a learning environment that achieves your goals. This systematic approach is called *Instructional Systems Design* or ISD for short. The result of ISD is the definition of four main ingredients in your training program: *instructional content, learning outcomes, instructional methods, and delivery media*.

This book is about the processes and guidelines you need to develop technical training that is consistent and effective. I define technical training as learning environments delivered in face-to-face classrooms or via computer designed to build job-relevant knowledge and skills that improve bottom-line organizational performance.

The Costs of Training Waste

It's a common and costly myth that if there are ten to fifty people in a room with an "instructor" at the front showing slides and talking, learning is taking place. In other words, a training "event" is assumed to result in learning. It is further assumed that learning translates into improved job performance. Another pervasive myth suggests that training delivered on a computer is not as effective as face-to-face learning. Whether delivered in a classroom or on a computer, often training events fail to realize their potential! Participants are unable to do anything new or different after training when they return to the job. Or if they can do new and different things, those things don't translate into job skills that align to bottom-line organizational objectives. In fact, some studies have shown that learners were better off before the training than afterward, when they felt confused and inadequate about their own abilities.

Exact estimates of training waste are difficult, since training results are so rarely measured that no one really knows for sure what has—or has not—been accomplished. Only about 50 percent of companies measure learning outcomes from training, and less than a fourth make any attempt to assess job transfer or work improvement resulting from training (Sugrue & Rivera, 2005).

The costs of ineffective training are twofold. First, there are the visible dollars invested in instructors, training materials, and training administration. This is not a trivial sum. The annual *Training* magazine industry survey reports that in 2006 over $56 billion were invested by U.S. organizations in training (Industry Report, 2006). And this is a low estimate because it does not include the most expensive element of any training program—the time workers spend in training events. When training funds are not well invested, the result is waste—not only of the training expenditures, but also from lost-opportunity costs of a workforce that lacks the skills they need to fully utilize the technologies or techniques required by their jobs.

A typical lost-opportunity scenario is associated with the development and installation of a new software system. Months, even

years, of effort and hundreds of thousands of dollars are invested in the design and development of the software. Then, sometimes almost as an afterthought, someone is asked to put together a training package for the end users. Because the resulting training is suboptimal, the software ends up underutilized and a portion—sometimes a substantial portion—of the system potential is never realized. Some new users ask for help from their colleagues in adjacent cubes. Others spend hours poring over confusing technical manuals. The immediate result is learning and performance that is inconsistent and inefficient. The long-term result is underutilized and mis-utilized software.

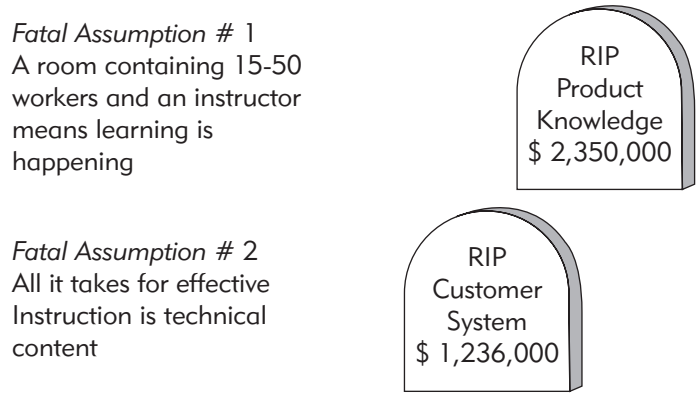
I write this book for individuals with technical training assignments who may be new training specialists or technical experts with an instructional assignment. As job performance become increasingly knowledge-based, there is a growing and appropriate trend toward using technical experts as trainers. But this brings us to another costly training myth: the misconception that all it takes for effective training is technical expertise, combined with the years most of us spent in formal educational programs. This assumption puts an unfair burden on the experts, who are not given adequate support in the preparation and delivery of their training. It is also unfair to the employees who are supposedly "trained" and later feel demoralized because they can't apply the skills needed on their jobs. Finally, poor training cheats the organization by failing to generate a return on investment. These two assumptions are illustrated in Figure 1.1.

Why We Can't Afford Ineffective Technical Training

Five major trends make the development of the human resource through effective training a greater priority than in the past:

1. New Technology: Organizations continue to be increasingly dependent on the use of new technologies, especially information technologies, as routine business tools. While many

Figure 1.1. Two Fatal Assumptions About Training That Lead to the Graveyard of Lost Business Opportunity



tools have improved user interfaces over the past ten years, in many cases new functionality goes unexploited in terms of productivity payoff.

2. A Knowledge-Based Workforce: Knowledge workers have nearly doubled in the last half of the 20th century from 37 percent in 1950 to nearly two-thirds of total employment in 2000 (Wolff, 2005). Reliance on a skilled workforce continues to grow in industries most dependent on safety, knowledge, and service. In 2005 the industry segments with highest per employee expenditures on training were transportation and utilities; finance, insurance, and real estate; and services (Sugrue & Rivera, 2005).
3. Lifelong Learning: An aging population requires organizations to think now about how to efficiently transfer a large skill reserve to replace a growing number of retirees. At the same time, new products, global competitors, updated policies, and emerging markets require a flexible workforce that can rapidly acquire and apply new skills. Lifelong learning requires continuous and rapid deployment of effective instructional resources.

4. Access to Learning Resources: The ubiquitous access to data via broadband Internet and wireless technologies makes channels of instruction broadly available to a wide population. Similarly, many workplace tools such as new software systems embed training and memory support within the tool itself. However, as we will see below, it is not the delivery medium that impacts instructional effectiveness. Only by using effective instructional methods can we harness delivery channels effectively.
5. Operational Alignment: In a global economic environment, learning must be aligned to business strategy and increasingly integrated into the work environment. Better decisions about how to deploy training resources will result in growth of "just-in-time" performance support resources and smarter use of formal training events that will be integrated as one element of larger performance improvement initiatives.

In the 21st century, the development of the human resource can no longer receive less than top priority in any organization determined to remain competitive. In fact, in a knowledge economy the emphasis shifts from traditional capital resources to the human resource for competitive edge.

If you are a technical expert, you are already a valuable resource for your skills and knowledge. But learn to transmit your expertise to others effectively and efficiently and you quadruple your value. If you are a new training specialist you will add value by learning to elicit knowledge and skills from experts and to organize and display that content in ways that lead to efficient learning and performance by the workforce. Follow the guidelines in this book and your training will enable the workforce to fully utilize the skills you teach and to feel more confident about their work tasks. Furthermore, if you follow my guidelines for measuring training outcomes, you will know—not just guess at—your training results.

What Is Technical Training?

Some interpret the term technical training as meaning "hard skills," such as using a new computer system or applying safety standards during equipment operations. I define technical training as "*a structured learning environment engineered to improve workplace performance in ways that are aligned with bottom-line business goals*." This definition includes five main elements:

1. Structured—An effective training environment is designed to optimize learning both during the training event and afterward on the job. Following a structured process and producing a structured product minimizes inconsistency in learning environments and aligns instructional products to job-essential knowledge and skills.
2. Environment—Workforce learning is moving from a series of isolated training events to environments that incorporate diverse knowledge resources such as repositories of examples, performance templates, and access to expertise, along with traditional events in face-to-face and virtual media.
3. Engineered—Effective learning environments do not happen by accident or by seat-of-the pants efforts. Effective learning environments are the products of a structured process and proven instructional methods matched to your content.
4. Workplace Performance—An effective training program starts and ends with the job. It includes guidelines, examples, and exercises that are job relevant.
5. Business Goals—An effective training program focuses on knowledge and skills that are aligned to important organizational objectives. Rather than training "communication skills," an effective learning design defines specific behaviors associated with the types of communications needed to support organizational objectives.

Technical training includes both hard and soft skills. It incorporates on-the-job performance support as well as training events—delivered in classrooms and on computers. Note that I emphasize training as a process rather than an event. Too often training is conceived and implemented as a discrete event with a beginning and end. Instead of "classes," consider learning as an ongoing process that can be engineered to include both traditional leader-led instruction in face-to-face or virtual classrooms as well as asynchronous activities and resources scheduled before, between, and after more traditional events.

Some important skill requirements such as management skills or skills associated with widespread computer programs can be achieved with "off-the-shelf" prepackaged training materials. However, many job tasks are unique to a given industry, organization, or department. No off-the-shelf training exists to meet these needs. It is this training that will be developed by or under the supervision of each organization's training staff. Industry-specific training runs the gamut from specialized computer systems to customer communication skills. It includes what we traditionally have called "hard" skills as well as soft skills. For example, in the banking or telecommunications industries the call center representative must be able to apply industry regulations, company-specific processes and policies, specialized computer applications, and communication skills to respond accurately and effectively to customer requests.

The Technology of Training

In the last part of the 20th century, training evolved from a craft to a technology. A technology is the application of scientific principles to achieve a practical and predictable result. That means the guidelines provided here go beyond a collection of experiences. Instead, they are based on research from learning psychology. The principles guiding the design of instructional materials constitute a relatively new field called *Instructional Technology*. Instructional technology takes a systematic approach to planning, developing, and evaluating

training. It also offers a set of guidelines that will help you package your technical knowledge in a form that makes it learnable.

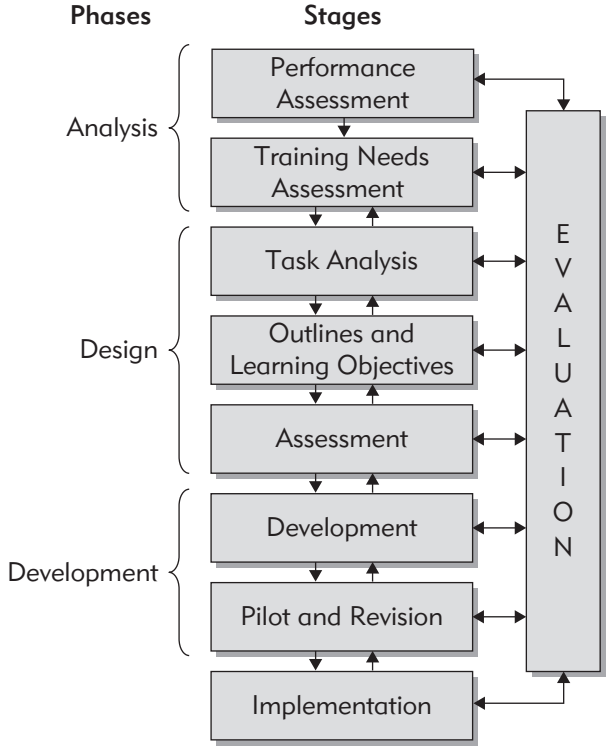
We begin with an overview of a systematic approach to defining, designing, and developing training.

Instructional Systems Design: An Overview

Out of large-scale engineering projects of the mid-20th century, systematic processes for planning, designing, and building products were born. In the production of complex products such as space stations and aircraft, it was discovered that front-end planning and design saved back-end grief in the actual production effort. More recently, data-processing specialists adopted a similar model called the Systems Life Cycle for the design of complex software. By spending up-front time in analysis and design, they avoid costly mistakes and subsequent rework during the actual construction of the software. Likewise, in the design of instructional products, a systematic process has proved much more effective than jumping right into producing learning materials. Used extensively by the military for training, *instructional systems design* (ISD) methodologies have been widely adopted by most workforce learning departments. Several texts on ISD are referenced in the For More Information section at the end of this chapter. For our purposes, a quick overview of the model will serve. If you are familiar with the ISD model, continue on to the section on the Four Ingredients of Instruction, next in this chapter.

Figure 1.2 illustrates a typical ISD model. Note the five major phases: *analysis, design, development, evaluation,* and *implementation*. The analysis and design phases, which can consume up to 50 percent of the total project effort, include stages of *performance and training needs assessment, task analysis, outlines and learning objectives,* and *assessment*. The next section will summarize each stage in the ISD process.

Figure 1.2. An Instructional Systems Design (ISD) Process



Performance Assessment

Often training professionals are asked to develop some type of training program when, in fact, training won't help. For example, in several recent government agency ethics scandals, the solution was ethics training. However, in and of itself, ethics training is unlikely to reduce unethical behaviors. Many factors influence workplace performance. Workers need clear job standards, feedback on results, incentives aligned to desired results, consequences for undesirable actions, usable tools and materials, and effective business processes, to name just a few. Training provides only one element of effective performance—knowledge and skills. Before jumping into a costly training design and development effort, conduct a performance analysis to ensure that, in fact, the business goal can be realized with

a training effort and also to identify what in addition to training is needed. For example, in cases of ethics problems, clear performance standards, feedback, and consequences for unethical behavior are needed.

Using Performance Assessment in Customer Service. Suppose you faced the following real-life problem. Customers were complaining that telephone service agents were rude. You are asked to develop a customer-courtesy training program. However, during the performance assessment, you note that agents are monitored and rewarded based on the number of customer calls they process during a day. Agents are required to handle at least 120 telephone calls per day and are "counseled" if performance falls below that level. The feedback-and-reward system encourages abrupt conversations in order to meet the target call volume. No amount of training will change that behavior as long as rewards are based solely on call volume. Therefore, the performance assessment report recommends several changes in the performance environment, as well as training.

Training Needs Assessment

Once you have determined that, in fact, a void of knowledge and skills does contribute to the problem or is required to meet the operational goal, you next define the specific knowledge and skills required. A training needs assessment is used to hone in on *what* training is needed by *whom* and how it should best be *delivered*.

Using Needs Assessment to Focus Credit Analysis Training. In a large utility, credit specialists complained that customer service representatives were mishandling the credit aspects of their job. Customer service representatives did not agree with the credit department's conclusions. To define what, if any, training was needed by whom, a training needs assessment was conducted. All the credit-related documentation generated by customer service representatives for a one-week period was collected and evaluated

for errors. During the same week, questions customer service representatives asked credit specialists were recorded and analyzed. As a third check, a credit skills test was administered to a sample of both customer service representatives and credit specialists. The actual credit documents, the questions asked by customer service representatives, and the items missed on the tests were analyzed for evidence of common misconceptions.

The test results showed that about 40 percent of both customer service representatives *and* credit specialists needed training on commercial accounts. The documentation evaluations and on-the-job questions confirmed the test results. The training needs assessment saved money by narrowing the scope of what needed to be trained as well as defining who actually needed training. In addition, workforce interviews determined that all employees had access to the corporate intranet and that a combination of training and working aids delivered electronically would be the most efficient approach.

In summary, the performance analysis and training needs assessment stages answer the question, "What are the best paths to improve business goals and, if training is one solution, who needs training on what, delivered how?" For more information on performance and needs assessments see the sources at the end of the chapter.

Task Analysis

Once you have determined what training is needed, your next step is to systematically define the content and outcomes of the training program. Now you will observe skilled performers, interview performers and managers, and review documentation relevant to the job. If you are a job expert already, you have much of the knowledge in your head. The problem is that much of your knowledge may be "tacit" knowledge. You have used your knowledge and skills for so long that they have become automatic. You will need to invest effort to adopt the mindset of the novice to be sure that you have included everything the unskilled worker needs. If you are a new

training specialist, you will need to interview and observe experts and read related documentation as the basis for your task analysis. How to do this will be described throughout the remaining chapters.

During task analysis you not only identify the knowledge and skill requirements of the job, but you also develop a learner profile that defines the target audience's prior knowledge and skills. Research tells us that prior knowledge is the single most important individual difference that will influence learning (Clark, Nguyen, & Sweller, 2006). By subtracting the existing knowledge and skills from those required by the job, you define the content of the training program. By adjusting instructional methods for learners of higher and lower prior knowledge, you maximize instructional efficiency. More detail on how to do a task analysis is included in Chapter 8.

Outlines and Learning Objectives

While you are defining the content of the training program, you also plan the sequence of content and the required instructional methods such as practice. You also specify what the learners will do with that content by writing clearly stated learning objectives. For example, if the content of your training program was how to change a flat tire, your lesson outline would include an introduction, a section on the major tools needed to change a tire with a brief practice exercise, a section on how to change the tire with hands-on practice, and a summary. Your learning objective would require the trainees to change a tire by the end of the program. The section on the Four Ingredients of Instruction that follows will describe learning objectives in greater detail.

Assessment

You will need some way to determine that your instruction has been successful. You do this by evaluating how well the trainees have achieved the learning objectives. If your objective stated that trainees would be able to change a flat tire, you would administer an assessment to see that each trainee in fact could change a flat tire at the

end of the course. To see whether your objectives have been reached, you design tests matched to the objectives. If trainees do well on the tests, you know your instruction has been successful.

Remember, I started this chapter by mentioning that many training programs cannot state what results have been achieved. That is because they often have no measurable instructional objectives. Or if objectives are available, there is no systematic attempt to see whether they have been attained. Even if the test results are not given back to the trainees, they can offer you evidence of the success of your instructional environment.

Each chapter in this book will describe appropriate testing techniques for evaluating your training effectiveness. However, the construction of useful tests is a major project in itself and requires specialized knowledge and skills. In addition, if test scores are reported to others, your organization will have legal requirements to validate the tests. If you are lucky, you may have testing experts in your organization. Check with your human resources department. Resources on testing are listed at the end of the chapter.

Development

Once you have completed task analysis and written outlines, performance objectives, and tests, you are ready to develop the instructional materials. The development phase involves the preparation of any instructional resources to be used by the learners during the training. This includes writing student workbooks, generating PowerPoint slides, developing practice exercises and case studies, or preparing video- or e-learning storyboards. This book offers guidelines to help you develop effective instructional materials for both print and computer media.

Piloting and Revision

Once you have developed a draft of your instructional materials, you will need to try them out. You will always find problems with them. Your directions may be confusing or you may not have

enough practice on a particular section. Only by pilot-testing your materials will you discover the problems. You will identify problems by interviewing the pilot group of students *and* by evaluating the assessments you give them during the pilot session. Based on what your pilot students tell you and on how they do on the assessments, you will need to revise the materials to resolve the major problems encountered. Your training program will never be perfect; focus on correcting major problems that surface in your pilot quickly and efficiently. Design of effective instructional environments is always a tradeoff between quality and time efficiency.

Implementation

After the instructional program is revised, it can be implemented on a major scale. This might mean distributing your course over the intranet to 50,000 learners worldwide or teaching it in a classroom to small groups of ten or twelve. Implementation requires effective processes to market the training, to assign the right training to the right workers, and to monitor and record training completion. Large organizations rely on learning management systems to administer the implementation of training.

Evaluation

You may notice that in Figure 1.2 I align evaluation to each stage of the ISD process. That is because there are several different phases to your evaluation efforts. A convenient way to summarize evaluation is with the four levels of evaluation developed by Kirkpatrick (1994). Level 1 measures learner reactions to the training. Most training organizations capture Level 1 data through "smile sheets" distributed at the end of the event. I already discussed testing to measure learning outcomes. Learning outcomes are the focus of evaluation Level 2. Even a new skill learned in class will not necessarily be applied back in the workplace. Level 3 measures transfer of learning—the application of new knowledge and skills after the formal training event. Finally, Level 4 gets back to the bottom line. Does

the training initiative result in improved organizational results and generate a return on investment?

Keep in mind that entire books have been written on each of the ISD stages I've briefly introduced above. I list several of these at the end of the chapter. My goal here is to give you an introduction to the ISD process.

Is ISD Dead?

Several articles written around the turn of the 21st century proclaimed the death of ISD due largely to the length of time required to work through the process (Gordon & Zemke, 2000; Zemke & Rossett, 2002). Looking around, however, at contemporary practices in learning organizations, it is safe to say that the death certificate was a bit premature.

What is dead is a lengthy linear approach to ISD. We have learned to be nimble by working in a circular rather than in a linear fashion. Thus rapid prototyping is used to conduct a fast job analysis and develop a first iteration "straw man" training. The straw man is then refined and elaborated with additional iterations through the ISD process. The number of iterations depends on the criticality of the training outcomes and the constraints of the situation, including time, resources, and political agendas.

With this overview of the ISD process completed, let's examine the four major ingredients of all training programs and relate them to the ISD model.

The Four Ingredients of Instruction

All training programs incorporate four major ingredients: *content, learning outcomes, instructional methods,* and *delivery media*. An effective training program carefully accounts for and deploys each ingredient to optimize results. To illustrate each ingredient, I use examples from an imaginary course on oral hygiene. The audience

for the course is a group of friendly humanoid aliens who are adapting to Earth culture. These aliens are familiar with mouths and teeth but that's about all they know.

Ingredient 1: The Content

It's obvious that all training includes content. The content, or course information, is defined and organized during the design stages of the ISD process—specifically during the job analysis and the outline stages. By subtracting the knowledge and skills of the intended audience from those of the job, you can derive final course content.

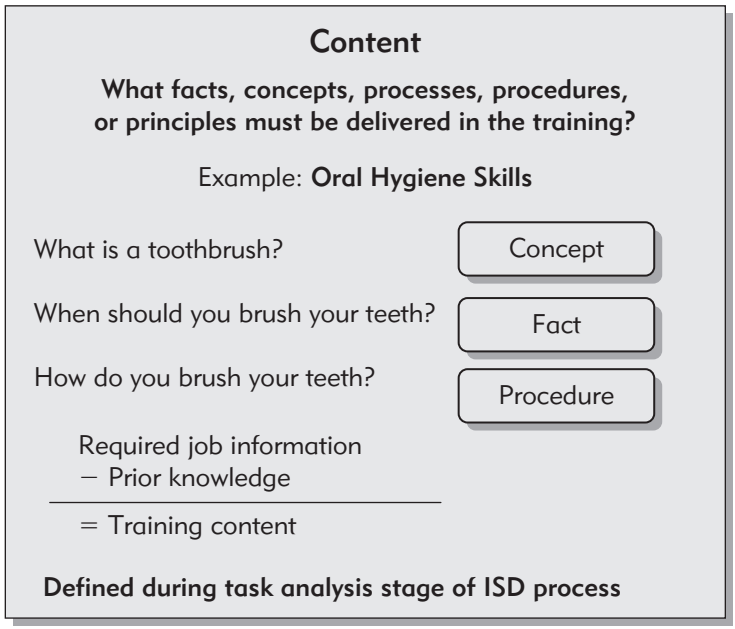
This sounds easier than it often is. That's why the analysis and design of your courses can consume up to 50 percent of your total development effort. If you are a technical expert, you may be one of the major resources of knowledge and skills. As mentioned above, your major challenge will be to make all that knowledge explicit and to organize it logically. If you are a training specialist, you will need to work with experts to identify the relevant content.

All training content can be classified as one of five types: *facts, concepts, processes, procedures*, and *principles*. This book is organized around each of these types of content. Thus, Chapter 3 deals with how to teach procedures, Chapter 4 with how to teach concepts, and so forth.

As shown in Figure 1.3, our oral hygiene course includes content related to toothbrushes, knowing how often to brush, and being able to brush correctly. Each of these is a different type of content. "Toothbrush" is an example of a concept, while "how to brush" is a procedure.

While the content is important, many training projects never go beyond it in their course development. Courses end up as massive dumps of information. To avoid this pitfall, ask yourself, "What do I want my learners to do with the content?" The purpose of business training is to give employees capabilities they need to perform their jobs effectively. Therefore, defining what workers must *do* with the content is as important as defining the content itself. That brings us to the second ingredient of instruction: the learning outcomes.

Figure 1.3. Ingredient 1: Content

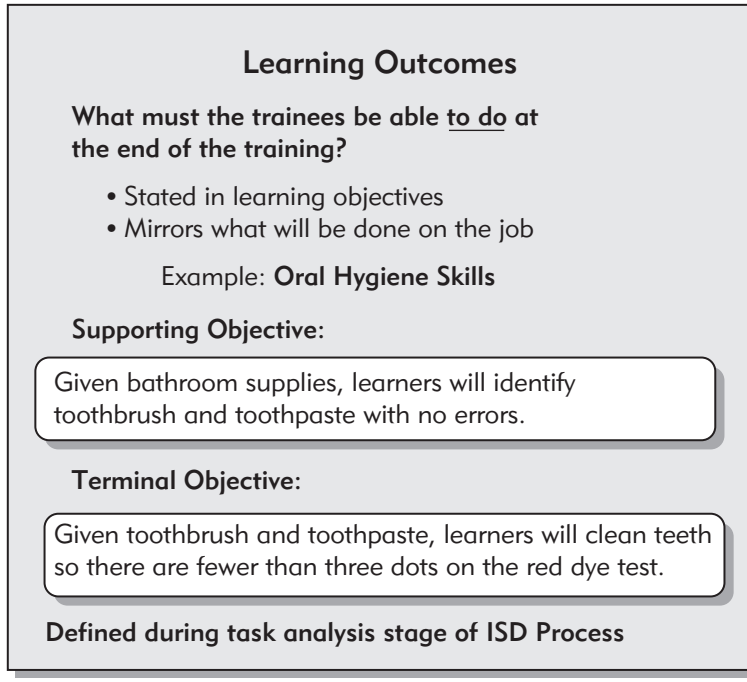


Ingredient 2: The Learning Outcomes

The learning outcomes are clear statements of what the learners will be doing when they have achieved course or lesson goals. We call learning outcome statements *learning objectives*. Learning objectives should mirror what must be done on the job. Each of your lessons will have at least one major learning objective, and many will include supporting objectives as well.

Note the learning objectives for our oral hygiene lesson in Figure 1.4. These sample objectives include a clear action statement, a description of conditions under which the action will take place, and a standard of quality required. The first objective is a supporting or enabling objective, which describes how the learner will demonstrate that he can identify the concepts "toothbrush" and "toothpaste." The second objective is called the major or terminal lesson objective. It describes what the student will do when he has learned the procedure of brushing his teeth.

Figure 1.4. Ingredient 2: Learning Outcomes



Notice that these learning outcomes include an *observable* action verb. They avoid use of words such as "know" or "understand." Why? The learning outcome will be used to measure the effectiveness of the training. Suppose your outcome was "the students will *know* what a toothbrush is." How will you or the students determine that they "know"? An observable action, something we can see right away, is required. So we ask the student to pick out the toothbrush from an assortment of common bathroom supplies.

The learning objective is important because it gives you a framework for designing practice exercises and evaluating lesson success. The learning objectives, practice exercises, and test items are like jigsaw puzzle pieces. Each matches the others to make the training internally consistent. And all of them match the job to make the training valid. For example, if the objective requires the learner to brush his teeth, a practice exercise will ask participants to brush their

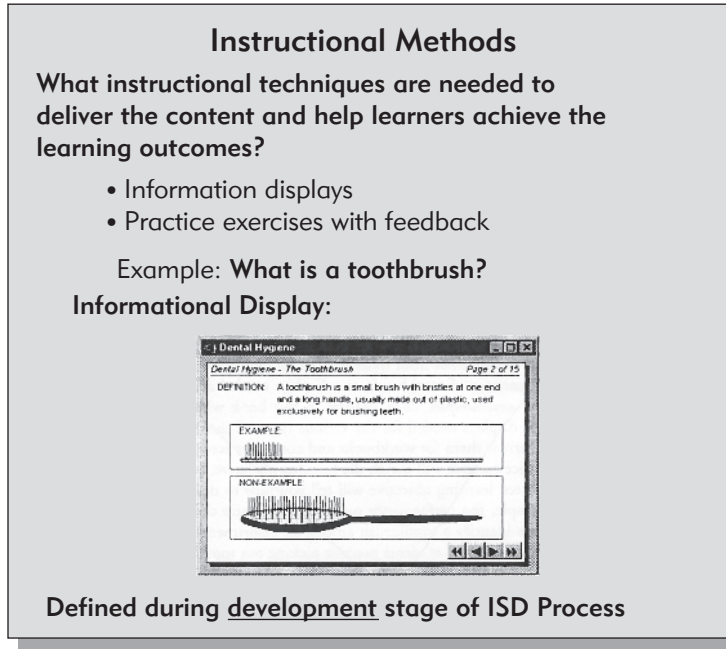
teeth during the class and a test will observe and evaluate participants brushing their teeth.

Ingredient 3: The Instructional Methods

This book is primarily about instructional methods. Once you have identified both the content and the learning objectives, you are ready to start developing the learning materials. When developing instructional materials, use a proven set of tools known as *instructional methods*. These methods are the psychologically active ingredients of your training program that will best promote learning.

As you can see in Figure 1.5, instructional methods are of two major types: informational displays and practice exercises with feedback. The type of informational displays you will need depends on the type of content. Displays for facts are different from those needed for concepts or procedures. Each chapter in this book will describe

Figure 1.5. Ingredient 3: Instructional Methods



the informational displays needed for the various types of content and show you how to format them for workbooks and for e-learning.

The practice exercise will match the learning objective. A well-written learning objective tells you how to design the practice. For example, the performance outcome that states that the learner will be able to identify a toothbrush among an assortment of bathroom tools tells you to give the students practice picking out toothbrushes from a variety of common bathroom supplies. I will describe how to design effective practice exercises in each chapter, with examples drawn from a number of successful training courses.

As mentioned earlier, this book will illustrate the use of these instructional methods for two main delivery media: (1) print in the form of handouts or workbooks and (2) e-learning, both synchronous and asynchronous. This brings us to the last ingredient of instruction: the delivery media.

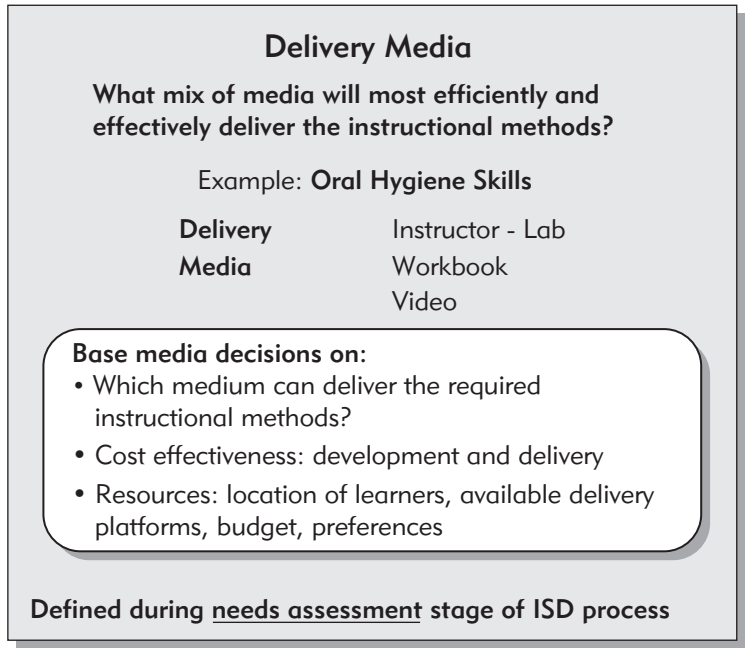
Ingredient 4: The Delivery Media

The instructional methods must be delivered through a medium or a blend of media. In a typical classroom, the media mix includes the instructor, a workbook or handouts, PowerPoint slides, wall charts, and perhaps a video. When designing e-learning, the computer is used to deliver visuals, animations, audio, or simulations. Many e-learning courses are supplemented by print materials. The delivery media used for our oral hygiene course includes an instructor, a workbook, and a video. (See Figure 1.6.)

Which Instructional Media Are the Best?

B.F. Skinner (1961) once wrote about teaching machines: "Obviously the machine itself does not teach. It simply brings the student into contact with the person who composed the material it presents. It is a labor-saving device because it can bring one programmer into contact with an indefinite number of students." Skinner would have been delighted to see his early teaching machine transformed into

Figure 1.6. Ingredient 4: Delivery Media



today's e-learning opportunities! In spite of Skinner's early insightful observation, research studies have tried for years to identify the best media. But there are no "best" media! As Skinner stated, the media are passive carriers of the active ingredients of learning—the instructional methods. No one medium is better than another as long as it can carry the methods needed to achieve the learning objective. Thus comparisons of courses taught by an instructor with the same courses taught by computer show no differences in learning, provided the same instructional methods are used (Clark, 1994).

Media Blends

Although it is instructional methods that determine learning—not delivery media—not all media are equivalent. Not all media can carry all instructional methods. For example, a book cannot deliver audio or simulations. Select the most cost-effective mix of media that will carry the instructional methods you need to achieve your goals.

For example, effective sales training requires examples of successful exchanges between account representatives and customers. An asynchronous e-learning lesson can be used to explain and demonstrate effective sales techniques. However, role-play practice may be best implemented in an instructor-led event. Also use media blends to move from a "training event" mentality to the concept of learning as a process that extends over time and space. For example, a formal training event is supplemented by intranet resources such as sample project proposals, video examples, blogs, wikis, and coaches.

Synchronous vs. Asynchronous e-Learning

As you can see in Figure 1.7, there has been a steady decline in classroom training in workforce learning over the past six years. It looks as if we are moving toward a 50–50 mix of classroom and digital delivery. e-Learning assumes two main formats: synchronous and asynchronous. Asynchronous lessons are generally self-study, self-paced lessons designed for solo learning. In contrast, *synchronous e-learning,* also known as the *virtual classroom,* is an instructor-led event attended by learners at the same time but in different places. Examples from an Excel course presented via asynchronous and virtual classroom e-learning are shown in Figures 1.8 and 1.9.

Figure 1.7. Percentage Training Hours Delivered by Classroom and Technology

Based on data from Sugrue and Rivera, 2005

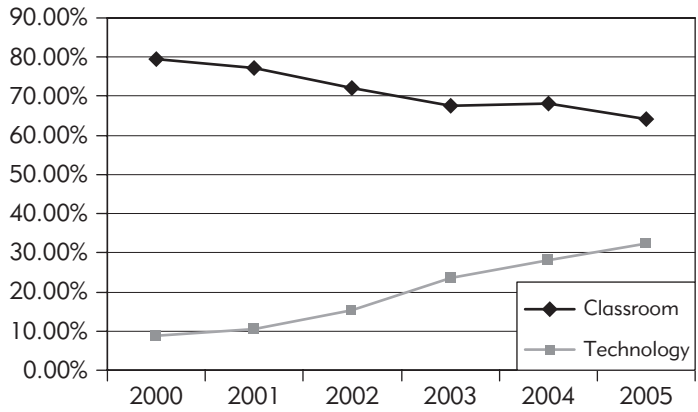


Figure 1.8. An Asynchronous e-Learning Lesson on Excel
From Clark, Nguyen, and Sweller, 2006

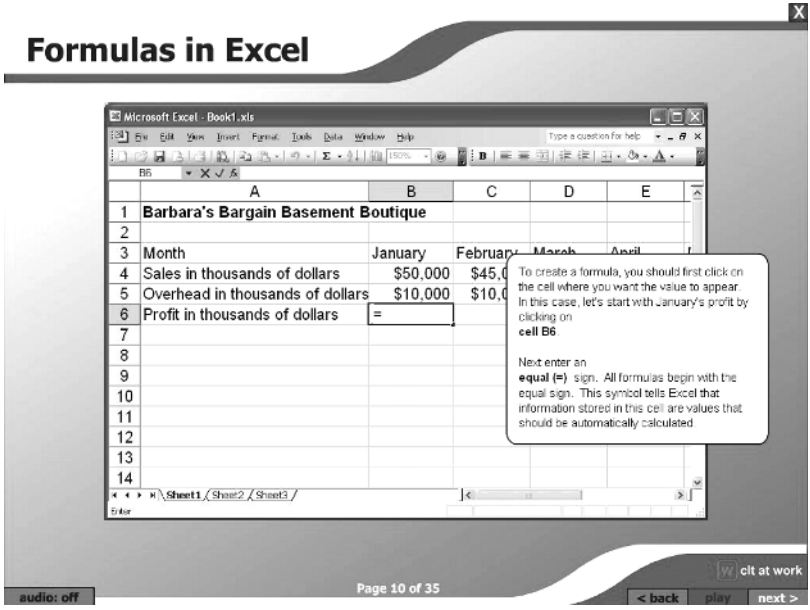
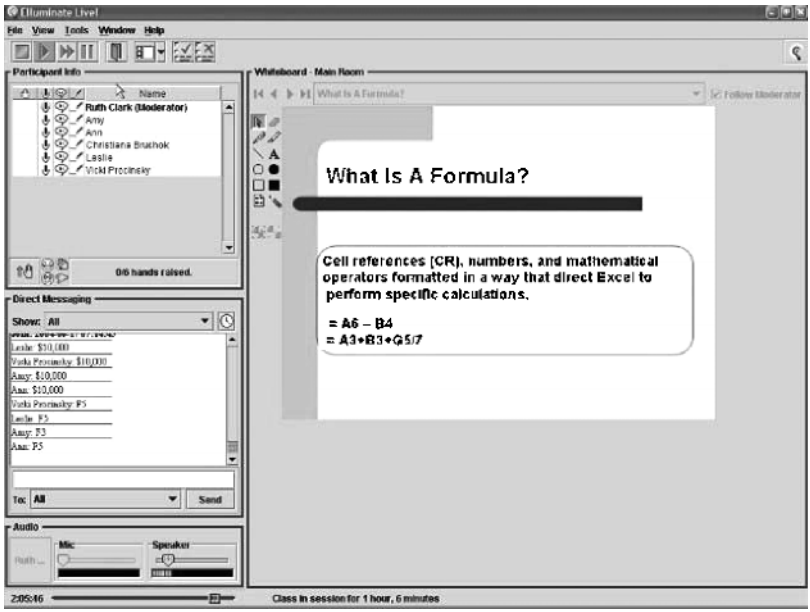


Figure 1.9. A Virtual Classroom e-Lesson on Excel
From Clark and Kwinn, 2007



I will illustrate how to implement instructional methods in both these forms of e-learning throughout the book.

Defining Your Media Blend

During the training needs assessment, you will typically determine what blend of delivery media will best meet your specific situation. If you needed to teach a course on statistical quality control, you could choose a classroom or an e-learning delivery. If the training methods were consistently designed, learning outcomes would be equivalent from either medium and your preference would depend on an analysis of cost benefit. If the course is to be delivered to 50,000 employees who work with computers already and are located internationally, it would probably be more cost-effective to use computer-based delivery supplemented with print than to pay the expenses of sending instructors and/or students to face-to-face courses.

Many factors can influence your selection of media. Some factors are pragmatic such as availability of computers to learners, location and number of learners, time (to produce and to consume learning), budget, criticality of skills mastery, and the political landscape of your setting. Other factors are instructional such as which modes (for example, visuals—still or moving, text, or audio) are best to promote learning, or which instructional methods, such as simulations or hands-on practice, are needed. There is no one set of guidelines for your media choices. Rather, you will need to consider each situation uniquely and select a mix of media—each meeting the pragmatic and instructional constraints you identify during your training needs assessment.

Time for ISD

Time and time again I hear the comment that training professionals are asked to have an extensive training program ready to go in two or four weeks. No time is allowed for analysis or design. These time pressures are due in part to the short timelines inherent in competitive business climates. They also reflect a lack of understanding of the ISD process—its resource requirements and its benefits.

The solution to short timelines is multi-pronged. First, establish good relationships with your line clients—relationships that build trust. As part of that relationship, educate your clients about the resources and benefits from applying an ISD process. Second, be responsive. Maybe you can't provide a full-fledged learning environment by the imposed deadline. But perhaps you could provide a "first phase." The first phase might be a series of working aids to get workers started. Third, evaluate outcomes. If you can demonstrate that your rushed training efforts did not lead to desired skill levels or to confident workers, you can perhaps leverage more resources—if not on this project, on the next one. Fourth, judge when to hold and when to fold. Leverage your resources on projects that are most likely to have strategic payoff to the organization.

Check Your Understanding

To see whether you can distinguish the four ingredients of instruction, try the practice exercise for Chapter 1 in the Appendix.

COMING NEXT

An Introduction to Structured Lesson Design

Now that we have overviewed the ISD process and the four ingredients of instruction, we will zoom into more detail at the lesson level. Chapter 2 will introduce you to structured lesson design with an overview of a typical technical lesson, a summary of the value of a structured writing approach for instructional materials, and an overview of the learning taxonomy that is the foundation for Chapters 3 through 7.

For More Information

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