CHAPTER ONE

AN OVERVIEW OF INSTRUCTIONAL DESIGN

Instructional design means more than literally creating instruction. It is associated with the broader concept of analyzing human performance problems systematically, identifying the root causes of those problems, considering various solutions to address the root causes, leveraging organizational and individual strengths, and implementing the interventions in ways designed to minimize the unintended consequences of action. Instructional design encompasses the preparation of work-related instruction and other strategies intended to improve worker performance. It does not mean throwing training at all problems or mindlessly plugging content into virtual templates.

As we use the term, *instructional design* is (1) an emerging profession, (2) focused on establishing and maintaining efficient and effective human performance, (3) guided by a model of human performance, (4) carried out systematically, (5) based on open systems theory, and (6) oriented to finding and applying the most cost-effective solutions to human performance problems and discovering quantum leaps in productivity improvement through human innovation. We follow the International Board of Standards for Training, Performance, and Instruction (IBSTPI) by making basic assumptions about instructional design and competencies associated with it. (See Exhibit 1.1.) In this chapter, we will explore each of the six characteristics identified above to lay the groundwork for the

EXHIBIT 1.1. TEN KEY ASSUMPTIONS ABOUT INSTRUCTIONAL DESIGN AND INSTRUCTIONAL DESIGN COMPETENCIES

- *Assumption 1:* Instructional designers are those persons who demonstrate design competencies on the job regardless of their job title or training.
- *Assumption 2:* Instructional design (ID) competencies pertain to persons working in a wide range of settings.
- *Assumption 3:* Instructional design is a process most commonly guided by systematic design models and principles.
- *Assumption 4:* Instructional design is most commonly seen as resulting in transfer of training and organizational performance improvement.
- *Assumption 5:* Instructional design competence spans novice, experienced, and expert designers.
- *Assumption 6:* Few instructional designers, regardless of their levels of expertise, are able to successfully demonstrate all ID competencies.
- *Assumption 7:* ID competencies are generic and amenable to customization.
- *Assumption 8:* ID competencies define the manner in which design should be practiced.
- *Assumption 9:* ID competencies reflect societal and disciplinary values and ethics.
- *Assumption 10:* ID competencies should be meaningful and useful to designers worldwide.

Source: R. Richey, D. Fields, and M. Foxon, *Instructional Design Competencies: The Standards*, 3rd ed. (Syracuse, NY: ERIC Clearinghouse on Information and Technology, 2001), 36–42.

remainder of the book. We shall also address important critiques of traditional instructional design approaches.

Instructional Design: An Emerging Profession

Instructional design is an emerging profession. People can—and do—enter jobs as instructional designers and work in that capacity for their entire careers. That is especially true when many organizations are converting their training to online, blended, and e-learning-based approaches. Instructional designers are often tasked to lead or facilitate such projects.

Employment advertisements for instructional designers and closely aligned jobs frequently appear online and in print. (See, for instance, the job search websites run by the International Society for Performance Improvement at www.ispi.org and by the Association for Talent Development at www.astd.org.)

Many organizations across a broad spectrum of industries employ instructional designers. Jobs bearing this title are often positioned at the entry level. They often occupy the first rung on a career ladder leading to such higher-level jobs as instructor, project supervisor of instructional design, and Chief Learning Officer (CLO). But variations of this career ladder exist. Job titles also vary. Alternative job titles may include talent developer, performance technologist, performance consultant, human performance improvement specialist, human performance enhancement professional, instructional developer, education specialist, educational technologist, employee educator, trainer, staff development specialist, instructional technologist, or instructional systems specialist. Because variations exist in work duties, in modes of occupational entry, in educational preparation, and in career paths, instructional design is an emerging, rather than an established, profession. It is called a field of practice, though it has been researched (see Rothwell, Zaballero, Asino, Briskin, Swaggerty, and Bienert 2015).

However, the trend has been toward certification in the field. That trend suggests increasing professionalism. For instance, the International Society for Performance Improvement supports a program leading to the Certified Performance Technologist (CPT) designation (for a description, see www.certifiedpt.org/WhatisCPT.htm). That follows a growing trend for certification of many kinds, ranging from individual (such as the CPT) to product or process accreditation (see www.iacet.org). ATD also offers the Certified Performance and Learning Professional (CPLP) designation to certify practitioners in a broad range of areas of expertise in the field (see www.td.org/Certification).

Instructional Design: Focused on Establishing and Maintaining Efficient and Effective Human Performance

The chief aim of instructional design is to improve employee performance and to increase organizational efficiency and effectiveness. Instructional designers should be able to define such important terms as *performance, efficiency,* and *effectiveness.*

What Is Performance?

Performance is perhaps best understood as the achievement of results, the outcomes (ends) to which purposeful activities (means) are directed (see

Rothwell 2015; Rothwell, Benscoter, Park, Woocheol, and Zaballero 2014). It is not synonymous with behavior, the observable actions taken and the unobservable decisions made to achieve work results. However, behavior can contribute to results and is therefore important in considering those results.

There are several types of performance. *Human performance* results from human skills, knowledge, and attitudes. *Machine performance* results from machine activities. Capital performance is about financial results. *Company performance* results from organizational activities.

When asked to think about performance, most people in the United States think first of individual performance. There are at least two reasons why. First, people are sensitized to appraisals of individual performance because most organizations make evaluating performance an annual ritual, often linked to pay decisions. This practice has made a lasting impression on nearly everyone. Second, U.S. culture has long prized rugged individualism, implying that little lies beyond the reach of determined heroes exerting leadership and acting alone. However, continuing trends point toward a sustained emphasis on teams, groups, departments, divisions, or organizations. Those trends are as evident in the instructional design field—where team-based, and often virtual team-based, instructional design is becoming more commonplace—as in other fields. That trend is likely to continue as global virtual teams work continuously, and often through collaborative software, to design instruction and then deliver it through trainers.

Defining Efficiency and Effectiveness

Traditionally, two aspects of performance have been considered—efficiency and effectiveness. These terms have no universally accepted definitions. However, *efficiency* is usually understood to mean the ratio between the resources needed to achieve results (inputs) and the value of results (outputs). Some have said that the central question of efficiency can be posed as this: *Are we doing things right?* In this question, the phrase "doing things right" means "without unnecessary expenditures of time, money, or effort."

Effectiveness usually means the match between results achieved and those needed or desired. Its central question is this: *Are we doing the right things?* In this question, the phrase "right things" typically means "the results others, such as customers or key stakeholders, expect or need from the organization, group, or individual."

Instructional Design: Guided by a Model of Human Performance

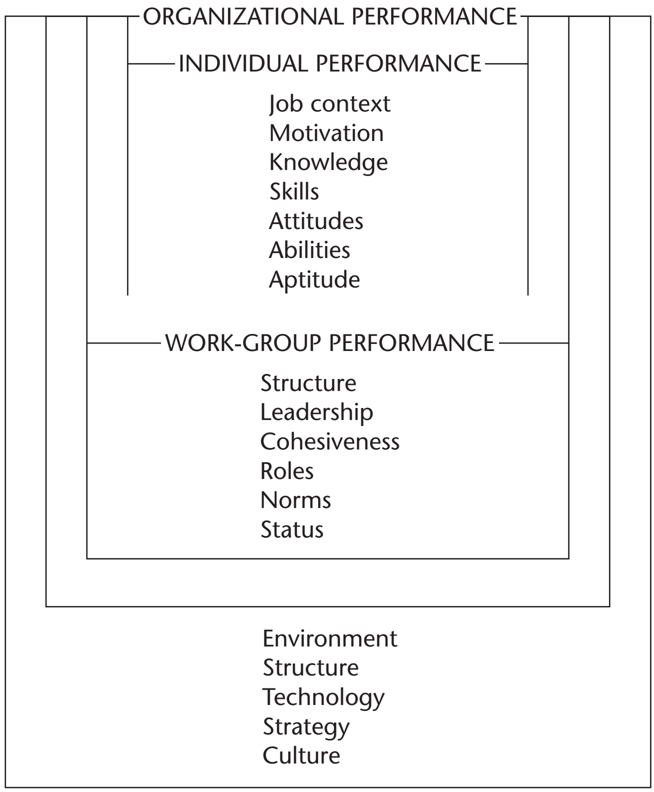
Instructional design is guided by a model of human performance. In the most general sense, a *model* is a simplified or abstract representation of a process, device, or concept. A model of any kind helps understand a problem, situation, process, or device. It provides a basis for a common understanding, and common labels, for people to discuss the issue. This applies to a model of human performance, which is a simplified representation of factors involved in producing work results. It provides labels to key factors involved in performance and clues to pinpointing underlying causes of human performance problems.

Many human performance models have been constructed (Abernathy 2010). They can be categorized as comprehensive or situation-specific. A *comprehensive performance model* includes factors affecting human performance in organizational settings. An example is shown in Figure 1.1 and Table 1.1. Table 1.1 defines and briefly describes the factors appearing in Figure 1.1.

Rummler's classic model, though published years ago, remains useful in analyzing human performance problems. (See Figure 1.2.) The root cause of the problem must be determined, and each factor in this simple model can be examined as a possible root cause. If it is not clear when the desired performance is necessary, the cause stems from the *job situation*. If workers cannot perform, the cause stems from the *performers*. If performers lack the skills or tools or other resources, the cause stems from the *response (behavior)*. If the consequences of performing are punishing or do not exist, the cause of the problem stems from the *consequences*. If performers are given no information about the value of their performance, then the problem's cause stems from *inadequate or nonexistent feedback*.

Instructional designers should base what they do on a human performance model. Applying such a model to problem solving is the foundation of instructional design. The field is associated with analyzing human performance problems systematically, identifying the root cause or causes of those problems, considering various solutions to address the root causes, and implementing the solutions in ways designed to minimize the unintended consequences of corrective action. The logic is akin to that of a medical doctor who identifies symptoms, discovers underlying root causes of those symptoms, and then prescribes medicine or therapy to address the underlying causes.

FIGURE 1.1. A COMPREHENSIVE MODEL OF HUMAN PERFORMANCE IN ORGANIZATIONS



Source: Taken from W. Rothwell and H. Kazanas, *Mastering the instructional Design Process: A Systematic Approach*, 4th ed. (San Francisco: Pfeiffer, 2008), 7.

Another view has emerged in recent years. Some have criticized instructional design as too reactive, focused too much on solving problems rather than avoiding them or (better) building on organizational and individual strengths. An important goal is to establish an engagement culture (Rothwell, Alzhahmi, Baumgardner, Buchko, Kim, Myers, and Sherwani 2014). That requires discovering what is going right and what is best and then inspiring a dream of a better future, leading to a high-performance workplace where people are so engaged that they do not experience productivity problems (Richman and Kirlin 2015).

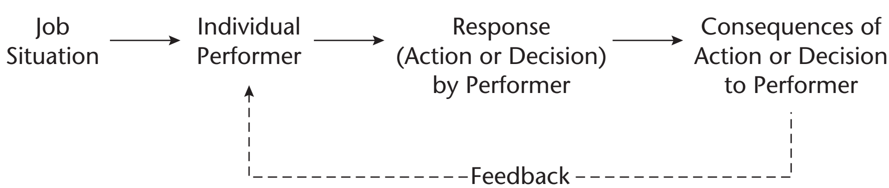
TABLE 1.1. FACTORS AFFECTING PERFORMANCE

Factor	Brief Definition	Questions to Consider about the Influence of the Factor on Performance
	Individual Performance	
Job context	The environment of the job, including supervisor(s), equipment and tools to be used, customers, and co-workers.	Do people have the necessary equipment, tools, and resources to perform?
Motivation	The desire to perform.	Do people want to perform?
Knowledge	Facts and information essential to performing a job or task.	Do people have the necessary facts and information they need to take action and make decisions?
Skills	Abilities to do things associated with successful job performance.	Can people do the things associated with successful job performance?
Attitudes	Feelings about performance that are voiced to other people.	How do people feel about their behavior?
Abilities	Present capabilities to behave in certain ways.	Do people possess the necessary talents and mental or physical characteristics?
Aptitude	The future capability to behave in certain ways.	Are people physically and/or mentally capable of learning how to perform?
	Work-Group Performance	
Structure	The way work is allocated to members of a work group.	Is responsibility for results clearly assigned? Are people aware of what they are responsible for? Are they held accountable for achieving results?
Leadership	The way directions are given to members of a work group.	Is it clear who is in charge? Does the leader consider how people feel (attitudes) as well as what must be done to achieve results (tasks)?
Cohesiveness	The extent to which members of a work group are unified, pulling together as a group.	Are people willing to work together to achieve desired results?
Roles	The pattern of expected behaviors and results of each member of a group.	Do members of a group understand what they are responsible for doing?
Norms	Accepted beliefs of the work group.	How do members of a work group feel about the results they are to achieve? What methods are used to achieve those results?

TABLE 1.1. FACTORS AFFECTING PERFORMANCE, cont'd.

Factor	Brief Definition	Questions to Consider about the Influence of the Factor on Performance
Status	The relative position of people in a group.	Do people have the formal authority to act in line with their responsibilities? Are other people willing to follow the lead of those who know what to do?
Organizational Performance		
Environment	The world outside the organization.	How well is the organization adapting to—or anticipating—changes outside it that affect it?
Structure	The way work is divided up and allocated to parts of the organization.	Is work divided up appropriately?
Technology	Actions taken by people to change objects, people, or situations. Often refers to "how the work is done."	Is the organization applying work methods that reflect current information about how to do the work?
Strategy	The means to achieve desired ends. It denotes an organization's long-term direction.	Is the organization competing effectively?
Culture	Beliefs and attitudes shared by members of an organization.	Do members of the organization share common beliefs and attitudes about what they—and the organization—should do?

FIGURE 1.2. A SITUATION-SPECIFIC MODEL OF HUMAN PERFORMANCE



Source: G. Rummler, "The Performance Audit," in *Training and Development Handbook: A Guide to Human Resource Development*, 2nd ed., ed. R. Craig (New York: McGraw-Hill, 1976), 14-3. Reproduced with the permission of McGraw-Hill, Inc.

Instructional Design: Carried Out Systematically

Instructional design is not just a field. It may also be a process for examining human performance problems and identifying solutions. The process should not be carried out intuitively; rather, its success depends on systematic application. Instructional designers place their faith in an iterative and systematic process that, viewed holistically, is more powerful than any single part. That process is not necessarily linear or step-by-step. Many systematic instructional design models have been constructed to guide instructional designers in their work.

Instructional Design: Based on Open Systems Theory

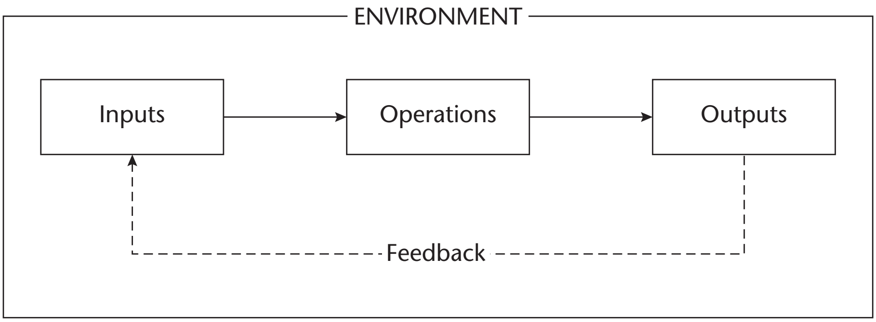
Instructional design is based, in part, on open systems theory. An *open system* receives inputs from the environment, transforms them through operations within the system, submits outputs to the environment, and receives feedback indicating how well these functions are carried out. To survive, any open system must gain advantages from its transactions with the environment.

Inputs include raw materials, people, capital, and information. *Operations* are activities within the organization that add value to raw materials. *Outputs* are services or finished goods released into the environment by the organization. Figure 1.3 illustrates these basic components of an open system.

All open systems share common characteristics. First, they depend on the external environment for essential inputs and reception of their outputs. Second, there is a pattern to the flow of inputs and outputs. Third, all but the simplest open systems are composed of subsystems and interact with environmental suprasystems. A *subsystem* is a system within a system. A *suprasystem* is an overarching system that includes more than one system.

As Katz and Kahn (1978) explain in their classic (and still relevant) treatment of open systems theory, most organizations comprise four generic subsystems. (They are called "generic" because they are found in most organizations, regardless of industry or reporting relationships.) The first is the *production subsystem*, which focuses on getting the work out. The second is the *adaptive subsystem* that includes any functions concerned with helping the organization change its internal operations to adapt to external environmental change. The third is the *maintenance subsystem*, which is

FIGURE 1.3. THE BASIC COMPONENTS OF AN ORGANIZATION AS AN OPEN SYSTEM



Source: Taken from W. Rothwell and H. Kazanas, *Mastering the Instructional Design Process: A Systematic Approach*, 4th ed. (San Francisco: Pfeiffer, 2008), 11.

concerned with streamlining internal operations and increasing efficiency. The fourth and last is the *managerial subsystem*, concerned with directing and coordinating the other three subsystems. Although organizations vary, in most firms the production or operations department exemplifies the production subsystem, the marketing department exemplifies the adaptive subsystem, the human resources department exemplifies the maintenance subsystem, and the top management team exemplifies the managerial subsystem.

Most organizations function within many suprasystems. Perhaps the most obvious is the *industry suprasystem*, composed of all organizations involved in the same basic work. There are also other, equally important, suprasystems. The *governmental-legal suprasystem*, for instance, comprises all government agencies regulating the industry of which one organization is part. It also includes the laws, rules, and regulations with which the organization must comply. The *marketing competitive suprasystem* comprises all competitors, present and future. The *economic suprasystem* comprises the national and international economic environment within which the organization functions. The *technological suprasystem* is composed of the tools, state-of-the-art know-how, and work methods used in delivering the organization's services or producing goods. The *supplier suprasystem* comprises all suppliers providing inputs to an organization. Each suprasystem influences organizational performance.

Open systems theory is important to instructional designers for two reasons. First, instructional designers recognize the critical importance of adapting to, and even anticipating, changes in the environment. Organizational and individual effectiveness depends on how well work results match environmental demands. Hence, one question that should be asked in any performance improvement effort is this: How much will this project contribute to the organization's ability to adapt to changing environmental conditions? If the answer is "not much" or "we don't know," then maybe performance improvement activities should be directed to other projects.

Second, instructional designers recognize that any corrective action taken to change one subsystem will affect others. The parts of any organization (system) are as interdependent as the strands of a spider web. A change in one part will affect others, just as an entire spider web vibrates when one strand is disturbed. If a change is made in the people selected into a job category, it will affect the training they should receive. Large system changes in organizations will have effects partially predictable—and partially unpredictable. However, order exists even amid apparent random disorder, a central view held by advocates of complexity theory. Observers of the instructional design field have repeatedly emphasized that much can be learned from complexity theory. Complexity theory enriches the traditional open systems orientation by providing a holistic view, rife with unpredictability, to the instructional design process (Johnson 2010).

Instructional Design: Oriented to Finding and Applying the Most Cost-Effective Solutions to Human Performance Problems

Instructional designers sometimes assume, mistakenly, that their role is to "offer job-oriented instruction"—which means "training." Sometimes others in the organization share the same misconception of their role. Human performance problems are complex and cannot always be solved by simplistic solutions such as instruction alone. Instruction should only be used when the performance problem stems from a lack of knowledge or skills or the wrong attitudes and when instruction is the most cost-effective solution. Since we will use the terms *knowledge, skills,* and *attitudes* throughout this book, perhaps some definitions are in order. *Knowledge* refers to what people must know to do their work; *skills* are associated with the ability to perform; and attitudes center on what people feel about what they do. As work becomes more focused on deciding, processing information, and servicing customers, *attitudes*—traditionally neglected by instructional designers in favor of knowledge and skills—are becoming more important in the mix of what leads to effective performance.

Instruction should not be the solution when a performance problem stems from lack of motivation, feedback, incentives, or some other cause. It is also a costly solution because it demands substantial investments of time and money to prepare effective instructional materials, test them, revise them, deliver them, and evaluate them. Employees receiving off-the-job instruction lose time doing work and are usually paid while learning, which adds to the cost. Instructional designers and others involved in preparing instructional materials must be paid, which further adds to the cost.

For all these reasons, work-oriented instruction is a costly way to improve performance. It should be a solution of last resort. Instructional designers should be certain there will be a favorable return on any investment in, and real business impact for, performance improvement efforts. They may apply many methods of cost-benefit forecasting and analysis to estimate the expected return (payoff) on the investment. First they estimate the cost of the performance problem. Then they estimate the expected costs to rectify the problem. Finally, they compare the two. If a return on investment takes too long, instructional designers should direct their attention to other projects in which the benefits are more certain, payoffs are higher, or results can be achieved faster.

What it takes to be an effective instructional designer today can be daunting. Many studies, apart from *The Standards*, have been conducted on instructional design competencies or related topics (see Kaufman and Bernardez 2012; Klein and Jun 2014; Marker, Villachica, Stepich, Allen, and Stanton 2014; Reiser and Dempsey 2011; Stolovitch 2015; Sugar, Hoard, Brown, and Daniels 2011). Almost everyone agrees that the field is demanding—and is becoming more so—due to intense time and cost pressures.

Criticisms of Traditional Instructional Approaches

No field of endeavor is immune to criticism. That is as true of instructional design as it is of any field. Critics of traditional instructional system design (ISD) approaches have grown increasingly strident in their complaints about its real and perceived shortcomings. It is worthwhile to discuss early in this book the most serious concerns voiced.

In a classic article that launched a continuing debate, Merrill, Li, and Jones (1990) distinguished between First Generation Instructional Design, which they designate ID_1, and Second Generation Instructional Design, which they designate ID_2. ID_1 "assumes a cumulative organization of learning events based on prerequisite relationships among learned behaviors" (7). ID_1 has long dominated the field but suffers from many limitations, according to the article's authors. They believe it focuses on parts rather than integrated wholes, provides superficial advice for organizing instruction, adopts a closed-system view of instruction that disregards the environment in which instruction is carried out, asserts an unrealistic approach to instructional development, and produces instruction that is to learners passive (and boring) rather than active (and motivating).

To solve these problems, the authors argued that a new ID_2 paradigm is needed in the instructional design field. ID_2 will lend itself to "analyzing, representing, and guiding instruction to teach integrated sets of knowledge and skills." It will also suggest ways to select "interactive instructional strategies" and will be "an open system" that is "able to incorporate new knowledge about teaching and learning and to apply these in the design process." In addition, ID_2 should—among other innovations—"organize knowledge about instructional design and define a methodology for performing instructional design," provide "a series of intelligent computer-based design tools for knowledge analysis/acquisition, strategy analysis and transaction generation/configuration," and make use of "a collection of mini-experts, each contributing a small knowledge base relevant to a particular instructional design decision or set of such decisions" (Merrill, Li, and Jones 1990, 10). More recently, Merrill has recommended a "pebble in the pond" approach that relies on key principles to guide instructional design (Merrill 2002 & 2015).

Other authorities in the instructional design field have joined the chorus calling for innovative new approaches to meet the daunting challenges facing today's instructional designers. One central dilemma, however, may not be that the field is in need of new models to guide instructional design but that existing models are not applied.

Additional critiques of the traditional ISD model have surfaced over many years. One complaint is about the process. It is, the critics contend, too slow and overly analytical for a frenetically paced world. The second complaint is about the practice. The ISD model is too linear, leading to an inflexible approach. ISD need not be treated that way—but, the critics assert, it too often is treated that way. Third, technological innovations have rendered the ISD model out of touch. What may have worked for classroom-based training is not appropriate, or even desirable, for e-learning and many emerging instructional technologies. The emergence of social media, in which individuals can communicate in real time, leads to increased pressure for real-time, instant-messaging-style instruction. Some believe that the problem with e-learning and other forms of technologically dependent instruction, itself under attack, is its tendency to truncate necessary steps of analysis, design, development, implementation, and evaluation. The result is that sometimes, critics contend, instruction is thrown at problems it can never solve because management action is needed instead.

In recent years, much attention has focused on the SAM (which stands for **S**uccessive **A**pproximation **M**odel) model as an alternative to ISD (Allen 2012). SAM is based on the notion, usually associated with the engineering field, of rapid prototyping. Rapid prototyping assumes that any organizational effort will be fraught with mistakes. The goal of SAM is to learn from mistakes quickly and get instruction out faster. The motto of SAM could be "get some instruction out there, assume it will be flawed, test it, and then move through overcoming the flaws as quickly as possible." Given the fast pace of many organizations, SAM responds to the feeling that the ISD model takes too long, even though critics call it a "shoot first and aim later" approach.

Other instructional designers eschew all models and just try to survive. They make it up as they go along. They may apply a model such as ISD or SAM or else draw from models in their own idiosyncratic approaches to design. While the danger of a purely *ad hoc* approach is that much will be forgotten, a games-based approach or an eclectic approach enjoys the benefit of flexibility in the face of daily challenges for speed and results (Kapp 2012; Rothwell, Zaballero, Asino, Briskin, Swaggerty, and Bienert 2015).

But one thing is clear: there is considerable pressure to reduce the time to deliver effective learning experiences. If the instructional design process appears to be slow and ponderous—which it does not have to be—the pressure is on to slash through slow turnaround times and experiment with more rapid, yet still effective, approaches to instructional design. Our goal in the following chapters is to describe the competencies of instructional design work and provide the means by which practitioners can develop, or sharpen, their abilities.