The loftier the building, the deeper must the foundation be laid.

—Attributed to Thomas à Kempis

WHY THIS BOOK WAS WRITTEN

As the Industrial Age cast its long shadow over the twentieth century, America experienced an urgent, unprecedented demand for a modernized citizenry and workforce. It was in this era that the practice known as instructional design emerged as a respected way of preparing instruction for education and training. In his landmark 1977 text, design pioneer Leslie Briggs proposed that using a prescribed, orderly sequence of steps, each step creating a product and building on the steps before it, helps solve one of the most complex challenges modern educators and trainers face: how to create instruction that consistently achieves desired results over time and across students. Though never proposed as a foolproof method, nor touted as the only path to good teaching, systematically applied instructional design offers logical—what some would call “common sense”—procedures for generating effective instructional solutions.

Changing times, however, have a way of disturbing the foundations of long-established principles. The last decades, tumultuous and transformed by technology, was a time of rumbling challenges to some of education's most fundamental concepts. Just when the answers to doing good design seemed solid and unshakeable, the questions themselves changed in form and character. As terms such as constructivism and virtual environments began to dominate design conversations, the underpinnings of traditional systematic instructional design methods seemed to some to slip away. This textbook proposes that the following themes are critically important in order to make time-honored instructional design procedures an even sturdier basis for building instruction to meet today's complex needs.

• **Emphasizing essential qualities of effective design.** Over the years since instructional design evolved into a systematic set of prescribed procedures, some designers have become increasingly detailed and rigid in their approach to required design steps at a time when flexibility and adaptation are becoming synonymous with survival. As Leslie Briggs stressed, design should be an “orderly but flexible sequence” (p. 7). This textbook focuses on the essential features of systematic design that offer clear benefits for improved results while still allowing maximum flexibility in how to carry them out in ways that address variations in design environments.

• **Illustrating design methods appropriate for any learning paradigm.** Briggs also maintained that instructional design should be “value-free . . . a problem solving methodology, not a position on what the goals or methods of instruction should be” (p. 16). This text shows how instructional design can be useful for creating effective materials and strategies for traditional, teacher-led classroom instruction, as well as for the inquiry-based, often-online, learning environments that have emerged in schools and training organizations in recent years.

• **Demonstrating design for new technologies.** As the capabilities of technologies to support teaching and learning have evolved, it has become clear that new learning platforms (what some designers call media or delivery systems) present dramatically different design challenges and call for very different development procedures than those for in-person instruction. Just as architects adapt their structural designs and building procedures according to the inherent qualities of various materials and sites they select (or are given to use), good instructional design requires carefully arranging the environment in which instruction will be used, thus creating a reliable structure to support learning. This text offers specific guidelines gleaned from both research and practice for how to create materials in ways that both manage the unique design challenges of distance and multimedia technologies and take advantage of their capabilities.
Recognizing that learning to design is different from designing. Design in real-world environments is a complex enterprise, each project fraught with new and unique problems and questions that would not usually surface in a semester-long college classroom or week-long workshop, let alone be addressed sufficiently in a textbook. Most current designers seem to agree that, though basic design skills remain crucial, experience in solving real-world design problems and in working with a design team are vital qualities for those who provide today’s instructional solutions. This textbook emphasizes that a first course on instructional design should help students focus on the rationale for each design step and design fundamentals, while giving them glimpses into real-world applications through examples and hands-on work with their own design projects. Each chapter provides explanation, example student projects, self-check exercises, and project criteria that help both students and instructors address design fundamentals that are achievable in a first course.

The purposes of this book are, therefore, to provide an accessibly-written, easy-to-understand introduction to instructional design that shows novices to the field how they can begin to apply systematic methods to their own design work; and to offer essential information about instructional design steps and processes that can increase the likelihood of instruction achieving desired results, even for today’s complex, multimedia and distance learning environments.

Though new and daunting challenges have emerged in education and training, this text proposes that the systematic methods described so long ago by Briggs remain relevant and vital. These are methods that can help prepare instructional designers to be astute architects of twenty-first century education and training.

WHO CAN USE THIS TEXTBOOK

This text has been created as an introduction to systematic instructional design concepts. It is most useful to those students and current professional educators and trainers who are new to the practice of systems-based instructional design, including: school teachers and school district staff development personnel; university faculty and trainers; trainers in business, industry, medicine, and the military; and any other personnel who need new tools to help them fulfill their assignments to create effective instruction.

COMPONENTS IN EACH CHAPTER

Each chapter helps support both instructors and student by providing:

- **Opening organizers.** These include a list of topics and outcomes to be covered and a hypothetical scenario that sets the stage for the problems and issues central to the chapter.

- **Audio overview.** Chapters 2 through 9 in the Pearson eText* have author-recorded audio overviews of the chapter, describing why the step covered in that chapter helps make the instruction product more successful.

- **Two teaching sections.** For each design step, first we provide a section of background on essential concepts, followed by a “how-to” section with explanation and examples.

- **Four example student projects.** These are artifacts, in the Pearson eText*, from design projects created by students in various education and training settings, each illustrating how to carry out the design steps described in the chapters.

- **Self-check activities.** These are activities in the Pearson eText* at the end of each content section, each matched to chapter outcomes, that encourage review of concepts and practice with topics students have just read about.

- **Chapter summaries and end-of-chapter exercises.** These end-of-chapter materials in the Pearson eText* help students review and reflect on the key terms and main ideas of each chapter.

- **Student project assessment aids.** These checklists guide and assess students’ products at each design step.

*These enhancements are only available in the Pearson eText, and will not be available in third-party eTexts such as CourseSmart or Kindle versions. To learn more about the Pearson eText, please go to www.pearsonhighered.com/etextbooks.
1

Rationale for Using a Systematic Instructional Design Approach

Let us watch well our beginnings, and results will manage themselves.
—Alexander Clark (1826–1891)

Chapter 1 Topics
- Why educators and trainers learn instructional design
- Origins of systems methods and characteristics of current design models
- Essential characteristics of all systematic design models
- Criticisms of systematic instructional design processes
- Essential characteristics of this text’s approach to instructional design
- How new designers will learn a systematic approach using this textbook

Chapter 1 Learning Outcomes
1. In scenarios describing systematic instructional design situations, identify which type of desirable results the activity could help achieve.
2. Explain the evolution of instructional design approaches by identifying the order in which key activities came about.
3. Identify essential characteristics of any systematic approach to designing instruction.
4. Identify some of the criticisms of past systematic design approaches and models.
5. Identify characteristics of the instructional design approach used in this textbook.
6. Analyze scenarios to identify problems that caused instruction to fail, and to identify features of the instructional design approach used in this textbook that could have prevented them.
7. Compare instructional design skills of apprentice designers learning from this textbook to those of experienced designers who have been applying the skills for some time.
SCENARIO

A results-driven approach to creating instruction

Two good friends, Bill and Cory, meet after work one day in a coffee shop. Bill is a ninth-grade teacher in a junior high school and Cory is a training manager in an insurance company.

“This day reminds me of that old Chinese proverb: ‘May you live in interesting times,’” said Bill, sitting down heavily. “You know the technological revolution we’ve been hearing about? Well, it came to roost on my desk today.”

“Really?” said Cory. “What happened?”

“Remember the health education course I have been teaching, the one the district administrators were so pleased with? It seems they were really impressed with my Internet activities and the PowerPoint presentations I designed, so my principal told me today they want to create a curriculum of our core courses in online format. One of the core courses is health education, and they think I’m just the guy to put that one online as a model for the others.”

Cory laughed, “Did you know they say there are two other proverbs that go with that first one? It sounds like the second one also came true for you: ‘May you come to the attention of important people.’ Now you know what I went through at work. I had to put my harassment-prevention workshop online, too, you know.”

Bill looked rueful, “I wish I could say there’s an app for that. I was still in the process of figuring out what to do about some of the handouts and activities that weren’t working so well.” He sighed, “I guess I’ll just put all the materials in a digital format, upload them all to the district’s Moodle site, and try to figure out how to make it all work together later. But maybe you could give me some pointers?”

“I’d be glad to, Bill!” said Cory, beaming. “The main thing is to design the course first, then design the space to house it. This is your golden opportunity to create something that works great for the kids and makes good use of the online format. I was lucky to be able to attend some instructional design workshops on how to create online and blended units and courses. When the company agreed to send me to the training, one of the first things we learned is that it’s not just a matter of uploading everything you are already doing. You really have to focus more on structure and, of course, building in interaction to take the place of being in a face-to-face classroom. The good news is that the course works so much better now than it ever did before. Evaluations are consistently positive, and almost everyone passes the course the first time.”

Bill shook his head mournfully. “It sounds like a lot of work,” he said. But then he looked hopeful. “How did you make it work so well?” he asked. “You say everyone passes it?”

“Nearly everyone,” said Cory, nodding. “A big part of its success was the result of the analysis and planning that goes into it. The sequence is now solid; when it was in-person, we were assuming some skills in the first lessons that we weren’t really teaching until later, and people were getting confused. The way we were testing them wasn’t that great, either. It really helped when we field tested the components. We were able to revise each of them before the course went active. It’s really a great course now; the employees like being able to work on it whenever they have time, we don’t have to arrange workshops that take employees away from their work, and I love teaching it!”

“Maybe the district would agree to send me to that workshop you went to,” Bill said thoughtfully. “Maybe before I can develop an online course, I need some training myself.”
“Sounds like a plan,” said Cory. “Just be careful of that third Chinese proverb in the series: ‘May your wishes be granted.’ You could become your district’s go-to designer!”

SECTION 1 • RATIONALE FOR USING A SYSTEMATIC INSTRUCTIONAL DESIGN APPROACH

FOUNDATIONS CONCEPTS OF SYSTEMATIC INSTRUCTIONAL DESIGN

The term instructional design is a generic one, commonly used to mean any approach to create instruction. This chapter serves to introduce the concept and procedures of systematic instructional design by explaining how it differs from other design approaches, how it has evolved over the years since it was first used, and how today’s designers use it.

Why Systematic Instructional Design?

The Need for a Results-Oriented Approach

The conversation between Bill and Cory, representatives of two different teaching cultures, focuses on the “results” that Clark spoke of in this chapter’s opening quotation. As one company president said, “Our clients are not asking for professionalism, they are asking for results. Nothing is more professional than results” (Zemke & Rosett, 2002a, p. 34). Regardless of differences in their teaching environments or subject matter, professional educators must confirm that their instruction has been successful. Perhaps that is why the methods described in this book are useful in so many different settings: They provide the essential planning and “beginnings” that create the hoped-for results. In this discussion, instructional design means systematic instructional design: a set of procedures for planning and developing teaching methods and materials to help make sure they achieve desired results. These procedures are also becoming increasingly important as educators such as Bill and Cory face the challenges of creating or transferring instruction to an online or blended environment in a way that takes full advantage of the capabilities these environments have to offer. The following are the key results indicators that educators look for to confirm that instruction does the job it was designed to accomplish.

1. **Students are motivated to learn and are kept engaged in learning.** Systematic methods work to ensure that students are motivated. They call for analyzing learner characteristics to identify what will draw learners into the learning environment and keep them interested in learning. Systematic methods also call for creating or locating materials and strategies based on the findings of an analysis of learner characteristics.

2. **Standards are addressed and students can pass required tests.** The focus of a systematic approach to instructional design is identifying desired competencies and verifying that instruction is designed to make sure students acquire these competencies. Competencies either may be based on standards that students must meet on tests or desired “habits of mind” that teachers want students to practice in their learning—or a combination of both.

3. **Instruction meets needs of learners with differing ability levels.** Part of an instructional design plan requires identifying the enabling and prerequisite knowledge and skills that students must have in order to learn the desired competencies. It also requires describing the conditions that will help students learn. Such analyses help teachers more quickly identify what students bring to the learning tasks and how they may be helped to higher levels of learning. Design methods also call for creating strategies to manage instruction for a group of students with varying “entry levels.”
4. Instruction is consistently successful in various situations. Part of a systematic instructional design process requires designers to review and try out instruction with students, find out what works and what does not work, and revise it to make it better able to meet its own stated objectives. When possible, tryouts are done by people other than the one(s) who designed it to help ensure instruction can achieve consistent results whenever it is used.

Design processes that incorporate the above key-results indicators help meet the challenges teachers and trainers face and increase the likelihood that their instruction achieves the results they want. Instructional design is done in order to answer the following questions about instructional methods and materials before they are used with the general population of students for whom they were intended:

- Does the instruction help students learn?
- Does the instruction keep students engaged in learning?
- Can the instruction help teachers and trainers meet the needs of students with varying ability levels?
- Does the instruction work well over time and with similar groups of learners?

Throughout its life, the concept of designing instruction has enjoyed such widespread appeal that several different perspectives have arisen on what it is and how best to accomplish it. An overview of past and current perspectives on instructional design will help clarify where the term originated and how the methods discussed here evolved from these beginnings.

Check Your Understanding 1.1

Objective 1 Exercise—Characteristics of Successful Instruction. For each of the instructional design activities listed below, identify from the following list the instructional result it is designed to achieve. Put the letter(s) of the desired results beside the number of each activity description. A single activity may achieve more than one result.

Desired results:

A. Students are motivated to learn and are kept engaged in learning.
B. Standards are addressed and students can pass required tests.
C. Instruction meets needs of learners with differing ability levels.
D. Instruction is consistently successful in various situations.

1. A trainer for a nursing certification program is preparing an online, self-instructional module for RNs to update their knowledge of presurgical procedures. She analyzes the enabling skills required for each of the new state standards in this area and makes sure the instruction is closely matched to skills required for each standard.

2. The writing instructor for the district’s upper-level alternative school plans writing activities matched to the interests of teenage students. He knows that many of these students are more likely to want to write better if they have an identified audience, so he arranges “e-pals” in other cities and countries with whom they can correspond and work on writing projects.

3. The training director for an insurance company prepares a video-based training package for customer relations personnel on how to carry out the company’s customer complaints policy. He asks two local human resources supervisors to review the training materials and give him their comments, and he has two experienced customer relations employees go through the entire package as students. He also requests a group of customer relations employees from another
Evolution of Systematic Instructional Design Models: ADDIE and Beyond

In the view of many educators, the term *instructional design* is synonymous with instructional planning; they feel it means *any* process that is used to develop instruction. However, even as most educators recognize that they should be prepared to teach effectively before they go into a classroom or before they develop a distance learning unit, they usually use a fairly general and unstructured approach to address this preparation. They may consider the general needs of the topic in terms of who is being taught, what has to be covered, the context in which it will be used, and any required test associated with the course or content. Then they go about setting up a series of activities based on these general needs and the available materials.

Such a planning approach has no required sequence or design steps, and materials may not be matched to the specific characteristics of learners who will use it. In some cases, primary resources or materials may be limited to existing ones such as textbooks and whiteboard. Also, there is rarely a tryout-and-revision phase that calls for gathering information to assess and revise the design. Once instruction is developed using a general planning approach, the next step depends on the instructor who uses it. Instruction may not change a great deal other than additions or updates to content; or if it does not achieve the desired impact, it may change every time the instructor teaches it. In either case, instruction designed in this way may rely on the instructor working closely with the students to monitor physical cues (e.g., smiles, nods, frowns, body language) or receive comments (e.g., e-mails) as indications that they understand what is being presented. Sometimes, it relies exclusively on results of a high-stakes test such as an end-of-course or certification exam to indicate whether or not instruction is working as desired. But even this latter indicator is a blunt instrument when it comes to determining what must be done to improve instruction if it is clear it is not achieving desired results.

There is another way to prepare instruction, one that is more systematic and based on a long history of successful use in business, industry, and military training and, less often, in schools and universities. As several authors have emphasized in their histories of instructional design, there have been many variations in the processes associated with instructional design, and even the name has seen several variations, e.g., systematic instructional design, systems approaches, instructional systems design (Saettler, 1990; Seels & Glasgow, 1998). This long and productive record may be viewed in three periods: origins, evolution of models, and modern perspectives.

**ORIGINS OF INSTRUCTIONAL DESIGN AND ITS TERMINOLOGY.** The earliest references to the term "instructional design" were in papers and reports from the 1940s and 1950s describing the development of materials and "audiovisual materials" for post-World War II military, industry, and university training (Twelker, Urbach, & Buck, 1972). In these days of building a large and skilled workforce for an increasingly technological age, American enterprises wanted instruction that prepared workers as quickly as
possible. Indeed, this remains a critical need in business and industry; time spent in training is time taken away from assigned work. So many people needed to be trained that media and materials were designed to supplement and support (and sometimes replace) instruction delivered by in-person trainers. Design techniques were created to help ensure that high-quality media and materials were developed as quickly as possible. Educational psychologists who had been helpful to the military in developing testing and training during the war became key members of the design team. To this task, they brought learning principles based on behavioral and cognitive learning theories that were just coming into popular use, as well as research on how these theories applied to the development of “audiovisual materials.” They referred to the products they developed as “training systems.” That is, the entire process was viewed as a system with inputs, outputs, processes, and feedback and control components. Learning activities for students to do were the inputs, student behaviors after instruction were outputs, learning itself was the process component, and feedback to designers helped them make improvements to the system.

As training systems were being developed in the 1940s and 1950s, instructional design became identified in the minds of many university and training personnel with the classical definition of educational technology. Although it was to take on other definitions later—as technologies for learning became widespread in education and training—Saettler reports that the term educational technology was used as early as 1948 to describe the process of solving educational problems using a systems approach. Each situation in which education or training was needed was a problem to be solved, and the resulting solution was a system of instruction. In the 1960s, the term instructional technology also came into use with a definition similar to that of educational technology, but with a focus squarely on solving problems directly related to teaching and learning, as opposed to other problems in education (e.g., administrative and communications problems). Instructional materials and media and the ways they were used were “technologies” (i.e., tools and methods) specifically created to help solve instructional problems. Reiser (2012) says that although instructional technology is an apt term for a systematic approach to solving instructional problems, the term instructional design and technology is sometimes used as a synonym for instructional technology to differentiate it from what most people tend to think of as “computers, DVDs, mobile devices” (p. 5) and other equipment and software. But educators and trainers who create instruction, whether or not they use a systematic method, usually refer to themselves as “instructional designers.”

INSTRUCTIONAL DESIGN MODELS OVER THE YEARS. In the 1960s and 1970s, systematic instructional design methods gained even greater popularity as educational psychologists began to apply behavioral and cognitive learning principles they had used with training systems to learning problems in education. Behavioral and cognitive learning principles guided instructional design first at university levels, then in schools. Similar to trainers in the military, business, and industry, university and school educators were faced with an increasingly large number of students entering classrooms at many different ability levels. Educators clearly needed help managing this task, and American business and industry leaders were relying on schools to send them students who had a foundation of skills and knowledge that prepared them to enter the world of work. Saettler (1990) observed, “The 1960’s produced most of the major components of the instructional design process” (p. 345): theory-based instructional design processes and models based on them.

The 1970s and 1980s witnessed the creation of a multitude of instructional design models, or sets of design steps that reflect a given design philosophy or theory. In 1972, Twelker et al. described five systems models in widespread use. By 1980, Andrews and Goodson reported over 40 models, and the number has continued to
Chapter 1 • Rationale for Using a Systematic Instructional Design Approach

Though often referred to as an instructional design model, ADDIE is actually an umbrella term for a whole family of models.

grow in the decades since then (Branch & Merrill, 2012; Gustafson & Branch, 2002; Reigeluth & Carr-Chellman, 2009). Each consisted of discrete design steps and, in many cases, substeps within these steps (Andrews & Goodson, 1980; Bradens, 1996; Briggs, 1977). Most of these models are variations on the same general design phases, a sequence commonly known as ADDIE, an acronym for: analysis, design, development, implementation, and evaluation. However, as Branch and Merrill (2012) and Molenda (2003) point out, ADDIE is not really a model. Rather, it is “an umbrella term that refers to a family of models that share a common underlying structure” (Molenda, p. 1; also see Branch and Merrill, p. 9). Molenda says that the origins of the term ADDIE are obscure. “The name itself seems to have been disseminated by word-of-mouth, beginning perhaps in the 1980s” (p. 3).

True instructional design models, especially those used in large-scale training development, break down each design step into substeps and call for more intensive analysis and documentation of each substep. The steps usually include: identifying an instructional need (sometimes called a “needs assessment” step), stating goals, analyzing goals for component skills and knowledge, stating objectives, developing instructional strategies, selecting and creating media and materials, field-testing instruction (a.k.a., formative evaluation), and revision based on results of field tests. The most widely publicized models are those that have been described in popular textbooks and represent interpretations of various experts (Dick, Carey, & Carey, 2009; Morrison, Ross, Kalman, & Kemp, 2013; Seels & Glasgow, 1998; Smith & Ragan, 1999). These are shown in Table 1.1, along with two other nonsystems models. Table 1.2 gives the defining features of each model.

In the 1990s, a theory began to dominate discussions about effective teaching and learning in the same way that behavioral theories did in the 1950s and 1960s. Though this theory, known as constructivism or inquiry-based learning, is not so much a learning theory as a “teaching theory,” Roblyer and Doering (2013) say that constructivist principles have been developed from learning theories as old as those of Dewey, Vygotsky, Piaget, and Bruner and as recent as Gardner’s multiple intelligences theory. Constructivist methods call for arranging activities so that students direct their own learning, rather than learn from direct teaching by teachers. Willis (1995), an advocate of constructivist methods, said that instructional planning processes for constructivist or inquiry-based teaching do not have to use a systematic design model with a specific sequence and detailed set of steps. He felt that traditional instructional design processes
### TABLE 1.1 Summary of Steps and Processes in Current Design Models

<table>
<thead>
<tr>
<th>Steps/Processes</th>
<th>Models Based on Systems Approaches</th>
<th>Other Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs assessment/analysis (identify instructional goals)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Learner analysis</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Context analysis</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Task analysis (sequence content)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Identify entry behaviors</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Write objectives</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Develop assessments</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Design instructional strategies</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Design implementation/delivery strategies</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Develop materials</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Formative evaluation</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Revise materials</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Summative evaluation</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

### TABLE 1.2 Defining Characteristics of Current Design Models

<table>
<thead>
<tr>
<th>Models</th>
<th>Characteristics</th>
</tr>
</thead>
</table>
| Dick, Carey, & Carey  
First published: 1978 | The first to elaborate a “classical” systematic design sequence and also the first to publish in textbook format |
| Kemp, Morrison, & Ross  
First published: 1994 | Has elements in common with most systems models, but does not specify a sequence; any element may be addressed at any time |
| Seels & Glasgow  
First published: 1990 | Described as a “generic” instructional systems design (ISD) model based on the five sequential ADDIE phases |
| Smith & Ragan  
First published: 1993 | Described as a “common model of instructional design;” the first to include context analysis and revision in the design sequence |
| McTighe & Wiggins (UbD®)  
First published: 2004 | Known as “backward design,” because it takes a different sequence to what many teachers use to design instruction |
| Willis (R2D2)  
First published: 1995 | “Process is recursive, reflective, and somewhat chaotic” (Willis, 1995, p. 12); calls for constant review and revision at each step |
were too linear and set down objectives too quickly, which led to inflexible, often inadequate design. Consequently, he advocated a “recursive and reflective” instructional design process that called for beginning by developing methods and materials and allowing specific objectives to arise out of development. He called this model **Recursive, Reflective Design and Development (R2D2)** (Willis & Wright, 2000). Although this approach has intuitive appeal, the nature of the model makes it difficult to replicate, and only a few applications of it have been reported in the literature, primarily by Willis’ students (Chen & Toh, 2005; Merkley, Duffelmeyer, Beed, Jensen, & Bobys, 2007).

Most recently, an attempt to streamline the systematic process and tailor it to the needs of K–12 teachers was the so-called “backward design” strategy sometimes called **Understanding by Design (UbD®)** (Wiggins & McTighe, 2011). It consists of only three steps: (1) identify desired results, (2) determine acceptable evidence (that results have been achieved), and (3) plan learning experiences and instruction. Though it has some of the features of a systematic model (e.g., creating assessments before developing instructional strategies), it is more a lesson-planning process than a true systematic instructional design model.

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**Check Your Understanding 1.2**

**Objective 2 Exercise—Evolution of Instructional Design Approaches.** Explain the evolution of instructional design approaches by numbering the terms to show the chronological order in which they came about. Place a number beside each term to show the order.

- ADDIE
- Constructivist methods
- Educational technology
- R2D2
- Systematic instructional design methods and models
- Understanding by Design or UbD®

**Click here for suggested answers**

**Essential Characteristics of Systematic Instructional Design Activities**

The history of instructional design has shown that, for instruction to be effective on a consistent, reliable basis, it must be created using a fairly structured approach that reflects key features. One of the “grandfathers” of instructional design, Leslie J. Briggs, described features he felt were essential for effective instructional design (1977, pp. 7–8):

1. A system designed to solve a problem
2. Agreement among objectives, materials, and assessments
3. An orderly, but flexible, sequence of planning to design the system
4. Design procedures based (as much as possible) on research
5. Tryout and revision of the resulting instructional system

A final feature Briggs named was comparison of the resulting system with other systems to see if the new one is an improvement over the other. However, he notes later that this final step actually follows the design process and is not an integral component of it (p. 338). In today’s practice, this final step is an optional one.

Systematic instructional design approaches have come about to make sure that design activities reflect the key qualities Briggs outlined. Instructional design based on a systems approach has several key advantages over less structured methods of developing instruction. The characteristics of systematic instructional design (ID) that have proven to have the most beneficial impact include: orderly planning and
documentation, careful matching of key components, development of supporting media and materials, and a tryout-and-revision phase.

**PLANNING AND DOCUMENTATION.** ID documentation is sometimes compared to lesson planning, but ID calls for more intense analysis and more detailed documentation than typical lesson plans. Also, lesson plans may actually only document instruction that has already taken place once. However, ID planning can address many kinds of problems, including the need for a new and better instructional approach when the current one has not worked well. For example, there is a topic that students repeatedly have trouble learning; or students come to the classroom at many different skill levels and need personal instruction the instructor has no time to provide. The required planning and documentation helps ensure the new instruction meets these needs.

**ALIGN OBJECTIVES, ASSESSMENTS, AND INSTRUCTIONAL STRATEGIES.** Three activities lay the foundation for all well-designed products. *First*, instructional objectives are always written in terms of what the students should be able to do after they complete the instruction. For this reason, they often are referred to as *performance objectives* or *outcome-oriented objectives*. *Second*, assessments are designed to measure exactly what is stated in the objective. *Third*, teaching strategies focus on making students able to do the performance stated in the objectives and demonstrate this achievement in assessments. Passing tests or meeting criteria is not the sole focus of instruction, but is an essential feature of it.

**CREATE MATERIALS AND DEVELOP MEDIA.** Unlike instruction that is purely lecture, systematic ID approaches usually call for creating materials that instructors can depend upon to achieve replicable results; that is, they help different groups of students learn well. For example, there may be learning packets, presentation software slides, videos, multimedia presentations, and/or web pages. Part of the rationale behind this is that human performance is always extremely variable. Well-designed materials and media help make instruction more replicable, that is, it helps it to be consistently effective over time.

**INCLUDE A TRYOUT-AND-REVISION CYCLE.** Systematic ID approaches always assume that even the most well-designed instruction will need “fine tuning” before it is used with students. Therefore, the designer tests the teaching sequence and materials with colleagues and students, identifies needs for revisions, and revises products to make them even more useful and effective.

### Check Your Understanding 1.3

**Objective 3 Exercise—Essential Characteristics of Systematic Approaches to Instructional Design.** Select and put together some of the following phrases to build an appropriate description of a systematic approach to instructional design, according to the perspective described in this chapter. (You may use more than one sentence to build your description and add other phrases, if desired.) If several small groups are working on building this description, compare descriptions.

- always makes tests or exams
- focuses only on directed instruction
- has a tryout-and-revision cycle
- calls for a ten-step or twelve-step process
- requires detailed documentation
- requires intense analysis
- emphasizes quantitative data collection
- is geared to solving problems
- requires developing media and/or materials
- matches objectives, assessments, and strategies
- emphasizes qualitative skills
- is highly prescriptive

[Click here for suggested answers]
Current Critiques of Systematic Instructional Design

Systematic instructional design models all have the same characteristics: planning and documentation; aligned objectives, assessments, and instructional strategies; media and materials with replicable content; and a tryout-and-revision cycle. But does the approach work? That is, does it produce the desired results? Gustafson and Branch (2002) report several descriptions of successful instructional design projects in the literature. However, they also say that the reason more “success stories” have not been published is that “practitioners do not have the time or motivation to prepare scholarly articles” (p. 20) about their successes. Systematic instructional design is a practical, results-oriented approach.

As is evident from the historical foundations described earlier in this chapter, there are many different ways of looking at instructional design. A review of current views and issues on this topic will show the unmet needs that led to this text’s perspective. Traditional instructional design based on systems approaches is currently the most popular method. Systems models have been used to design successful training and teaching programs in business, industry, and military settings, although they have seen limited use in schools and universities. Several common issues show why systematic instructional design has not seen universal acceptance even in fields where it is commonly used.

VARIATIONS AMONG MODELS. Branch and Merrill (2012) say that many variations among models come about because of differing requirements for implementing instructional design in various settings. Classroom instruction delivered by an instructor calls for different design methods than products such as computer-based instructional materials or for instructional systems such as distance learning courses or self-paced training tutorials. Regardless of the reason, the sheer number of models currently in existence tends to confuse many educators and would-be designers. Which one is correct? What features make one better than another? Should there be a different model for each design situation? Should certain key design steps be required?

CRITICISMS OF SYSTEMATIC INSTRUCTIONAL DESIGN. The 2000s and beyond present new challenges to American education and training as well as to those who design instruction for these settings. One of the challenges to designers comes from an unexpected source: some of those trainers who have depended for decades on instructional design models and methods based on systems approaches. Issues of Training (Gordon & Zemke, 2000; Zemke & Rossett, 2002a, 2002b) were a forum for an attack on traditional “ISD” as it has been practiced in business and industry training. The authors of these articles summarized the comments of six prominent business and industry designers. The designers say that models as they have been applied in the past are ineffective for the needs of today’s learners because they have the following drawbacks:

1. Systematic models take too long. The critics say that many current models based on systems approaches have so many required design steps and call for such extensive analysis and documentation that the process becomes unwieldy. This is especially true if designers must get approvals on documents for each design phase before they can proceed to the next phase. By the time all the steps are done, critics say, the topic may have changed so much that instruction is no longer relevant.

2. They ask designers to follow steps blindly. Designers who use design models have justified the time it takes to complete these models with the belief that
they present an *instructional technology*: a tool which, if used correctly, will lead invariably to good instruction. However, critics say that it requires designers to follow design steps so rigidly that completing the design process becomes the central focus; they lose sight of whether or not the resulting instruction really meets learners’ needs. They point out that nothing inherent in design models ensures good instruction; the insights and skills designers bring to the task is still an important variable.

3. **Today’s workforce requires learning-to-learn skills.** Some critics say that designers learn to follow models so rigidly that the focus of the instruction becomes merely imparting a set of skills. Today, they say, the learning experience is as important as what is learned. Instruction that focuses only on skills produces “homogeneous employees who lack flexibility and creativity” (Zemke & Rossett, 2002b, p. 35). Instruction should require students to be flexible, creative learners, rather than robots who learn things in a rote way.

4. **They provide little or no guidance on design of learning environments.** A final criticism of past design approaches is that they fail to give adequate guidance on how to design the environments in which instruction is delivered. For example, instructional materials such as online discussions and podcasts or vodcasts may be well designed, but their success in an online course depends greatly upon the structure and support of the environment in which they are used. Even learning activities within in-person classrooms are increasingly technology driven, and some guidance is needed on how to structure an environment that supports these activities. This step that emphasizes structuring learning environments may be seen as the “I” (implementation) phase of ADDIE, which many other models either ignore or treat only cursorily.

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**Check Your Understanding 1.4**

**Objective 4 Exercise—Criticisms of Past Design Approaches.** Identify from the following list some of the criticisms of systematic design approaches that this textbook aims to address. Place a checkmark by all that are applicable:

- ___ Systematic models are too complex to understand and follow.
- ___ Systematic models take too long.
- ___ Some models ask designers to follow steps blindly.
- ___ The processes do not always produce desired results, even if followed closely.
- ___ Systematic design methods cannot foster skills that today's workforce requires.
- ___ There is little or no emphasis or guidance on design of learning environments.
- ___ Some models work better than others.
- ___ Design models lack an adequate theory base.
- ___ Design models cannot teach workers to exercise creativity or flexibility.

[Click here for suggested answers]
Characteristics of an Effective Instructional Design Model

Although even the critics of systematic instructional design methods do not say that they should be abandoned entirely in favor of an “artistic approach,” it seems evident that changes are required in the way such methods are learned and applied. This textbook emphasizes an instructional design approach based on the steps and elements outlined by Briggs over 35 years ago, but updated to reflect today's design challenges. The approach described here emphasizes some of the essential features of all systematic models, but it also offers a new way of looking at them in order to address problems in past uses of these models.

1. **ID should focus on solving a problem.** The ID process should begin and end with a problem that has been identified by someone in an organization or institution such as a business, school, or college. The first step in the process should be to confirm that the problem can, indeed, be solved by instruction, rather than by a change in the environment. For example, an analysis of the problem may discover that students are not using the library for research because they don’t like to spend their free time going there, rather than because they don’t have adequate instruction in library skills. Workers may be using a new software system incorrectly because they are skipping steps to save time, rather than because they don’t know correct procedures. One example of a common problem in today's society that does require instruction is the need to transfer an in-person course to an online or blended environment. In any case, once a problem is identified as requiring instruction, everything the designer develops should have a demonstrable impact on solving the problem.

2. **ID should be an orderly but flexible activity.** Designers are encouraged to think of the steps in the ID model as a heuristic, rather than a prescription: steps for thinking through important instructional planning decisions in an orderly way, rather than as a “cookbook” set of tasks that, once completed, guarantees a high-quality product. This means that designers must know a great deal about effective teaching before they can create good instructional products. The knowledge and experience they bring to design is as important as design steps to ensure a successful instructional package. One feature of model-based instructional design that sets it apart from less systematic planning methods is that it calls for specifying key information about expected student performance (e.g., goals, objectives, assessment strategies) before designing methods of teaching these performances. However, designers are encouraged to see both these tasks and their products as guidelines that may change as new ideas or information arise. Design documents should never be considered ends in themselves.
3. **ID should incorporate what we know about effective teaching and learning.** Several design steps provide opportunities for designers to apply principles from learning theory, research, and effective instructional practices. These steps help ensure that the resulting instruction incorporates findings from what we know about how people learn and retain knowledge in various learning environments, and how best to meet the needs of learners at varying ability levels. It is important to note that the design model used in this book allows for instruction to reflect constructivist principles. Much of the instruction for today’s learners can and should reflect the new emphasis on setting goals and using teaching and assessment strategies that empower student learning and represent a changed role for instructors.

4. **ID should confirm that the instructional system works.** Several design steps focus on how to make sure instruction works as designers intended. Initial steps in the design process require designers to state criteria for determining that students have learned from the instruction. Final steps call for trying out materials to make sure these criteria are being met (formative evaluation activities) and confirming that the instruction is, indeed, responsive to the problem that initiated the design activity in the first place.

5. **ID should provide assistance in using new technologies for learning.** Instructional design processes call for creating media and materials to support learning. Although developing these materials takes time, it also saves time because powerful, reusable resources with proven effectiveness are available to support instruction for specific topics. These materials make it possible for people other than the designer to use the instruction with confidence that materials were designed, tested, and improved for use with a given population. The “audiovisual” materials developed by designers so many years ago have evolved into more sophisticated advanced technologies such as instructional software, multimedia, and web pages. While instructional materials in print format will be in use for some time, newer technologies such as e-texts, distance technologies, and multimedia products have been shown to offer such uniquely powerful, interactive features that instructional delivery systems based on them have become increasingly evident. These new environments present unique challenges for designers, as well as unique opportunities. This textbook emphasizes how to address the special design considerations these new technologies present.

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**Check Your Understanding 1.5**

**Objective 5 Exercise—Instructional Design Characteristics Emphasized in This Text.** Identify from the following list the characteristics of the systematic design approaches emphasized in this textbook. Place a checkmark by all that are applicable:

- 1. Offers guidance for strategies that are primarily constructivist
- 2. Specifies that goals, objectives, and assessment strategies cannot be changed later
- 3. Provides several activities to make sure the instruction is working
- 4. Shows how to meet challenges presented by new learning environments
- 5. Offers a prescription for how to design “can’t-fail” online learning environments
- 6. Design activities always focus on solving an instructional problem
- 7. Offers highly prescriptive “cookbook steps” that guarantee good instruction
- 8. Offers steps in the design model as a heuristic for thinking through key decisions
- 9. Requires that designers already know a great deal about effective teaching
- 10. Requires designers to create strategies that reflect principles from learning theories

[Click here for suggested answers](#)
Design Model Overview

The instructional design approach used in this text is represented by the model diagram shown in Figure 1.1. This model reflects essential steps placed in an optimal order for carrying them out. This model allows for the considerable variation that occurs in the context of actual instructional projects. It is intended as a guide, rather than a prescription. An overview of the activities accomplished at each design step is provided in Figure 1.1 and Table 1.3, but details on how to carry them out is given in subsequent chapters.

Phase I: Analysis

- **Identify instructional problems and state goals.** Designers begin by gathering information to confirm that a systematic instructional design process will, indeed, result in a good solution to the problem. Two activities lead to preparing a statement of one or more learning goals. First, designers gather information on the nature of the problem and decide if instruction is the best solution. Sometimes, instruction will not solve the problem because the problem is based on other needs. If it is, designers must decide whether or not the spending time on a complete systems approach is feasible and, if not, what modified approach should be used.

- **Analyze goals.** Good instruction requires what Gagné referred to as *conditions that are designed to support learning* (1992). These conditions may include teaching all the subskills or tasks that comprise the final skill, using an appropriate sequence and strategies to teach them, and meeting the special requirements of learners (e.g., reading level, accommodations for disabilities). To ensure that these conditions are met, designers identify what kind(s) of learning the goal(s) represent (e.g., concepts versus problem solving, cognitive domain versus affective domain), prepare a learning map of an optimal sequence for learning tasks, and write a description of essential conditions for the learning environment and materials.

- **State objectives and assessment strategies.** Using the learning maps to guide them, designers write statements of observable behaviors that students will have after they have learned and specify appropriate ways an instructor can measure these behaviors. Because there will be a close match between the statement of what a student will be able to do and the way it will be measured, objectives and test specifications are prepared at the same time. Finally, the designer states criteria that can be used to say with the desired degree of confidence that the students have met the objectives of the instruction.

![FIGURE 1.1 Representation of the systematic instructional design model.](image-url)
### TABLE 1.3 Instructional Design Steps, Critical Focus Questions, and Products

<table>
<thead>
<tr>
<th>Steps</th>
<th>Critical Focus Questions</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase I: Analysis</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Analyze need(s) and state goals | • What is the reported problem?  
• Does the problem have an instructional solution?  
• Does the instruction lend itself to a systematic ID approach? | Instructional goal statements: Statements of actions students will be able to demonstrate as a group after instruction |
| Analyze goals for learning conditions and sequence | • What are the constraints on design resources?  
• What characteristics of the learning environment will affect how instruction is designed?  
• What characteristics of learners will affect how instruction is designed?  
• What skills and knowledge are required in order to do the performance specified in the instructional goal?  
• In what order should the required skills and knowledge be learned?  
• What skills and knowledge should be required as entry behaviors or entry skills? | Description of design environment  
Description of learners and learning environment  
Learning map(s) |
| State objectives and assessment strategies | • What behaviors will students have after they have learned?  
• What is the best way to measure student behaviors?  
• What criteria should students meet on assessments? | Instructional objective statements  
Descriptions of assessment strategies  
Statements of criteria |
| **Phase II: Design, Development, and Implementation** | | |
| Design and develop assessment instruments | • What instruments are needed?  
• In what format should assessments be administered? | Assessment instruments  
Delivery system for assessments |
| Design instructional strategies | • What instructional events are needed for the type of learning? | Planning documents (e.g., storyboards)  
Instructional media/materials  
Directions for using materials |
| Develop materials and media | • What materials are needed to deliver the instruction? | Planning documents (e.g., storyboards)  
Instructional media/materials |
| Develop learning environments | • What platform (e.g., classroom, content management system) is needed to implement instruction?  
• What must be done to organize an optimal learning environment?  
• What support is needed for the instruction to be successful? | Directions for using materials  
Learning environment ready for use by students and teachers |
| **Phase III: Evaluation and Revision** | | |
| Formatively evaluate instruction | • Does instruction engage students?  
• Does the instruction teach (i.e., enable students to meet the stated objectives and pass the tests)?  
• Is instruction effective with students of various ability levels?  
• Is instruction effective over time? | Data/feedback on students’ attitudes toward instruction  
Data/feedback on students’ performance with instruction |
| Revise instructional components and characteristics as needed | • What changes does formative feedback indicate need to be made in goals, objectives, sequence, strategies, materials, and/or media? | Revised, improved instruction |
| OPTIONAL: Summatively evaluate instruction | • Is the program/product better than the previous one?  
• Is the program/product better than an alternative choice?  
• Should the program/product be adopted or continued?  
• Did learned skills transfer?  
• Did the program/product improve the organization?  
• Has the problem been solved? | Data/feedback from learners and those in the organization to make decisions |
Phase II: Design, Development, and Implementation

- **Design and develop assessment instruments.** Designers prepare the actual instruments and procedures that will assess how well students have met the objectives. Depending on the behaviors being measured, instruments may be mental skill and information tests (e.g., multiple choice, short answer), performance or criteria checklists, rubrics, or combinations of these. Instruments include directions, criteria required for passing tests, any information instructors would need to administer them, and the delivery system for the assessments (e.g., an online testing system).

- **Design instructional strategies.** Designers select strategies to meet required conditions for learning, strategies that are matched to the type of skills being learned and learner needs, including those for motivation. Strategies always consider best theories for guiding learning to ensure both motivation and retention. These decisions set the stage for how materials and media will be designed.

- **Develop materials and media.** At this stage, designers create the resources that will carry out instructional strategies. They first prepare storyboards or other planning documents, and then create the media and materials components based on the plans.

- **Develop learning environments.** Finally, the designer creates a classroom environment with characteristics needed to deliver the instructional materials. This environment may be traditional/in-person, online, or a combination of these (blended). This may also mean preparing teachers and students to learn in a different way than they are used to.

Phase III: Evaluation and Revision

- **Formatively evaluate instruction.** Designers gather feedback and data to determine what should be changed to improve the clarity and usefulness of the materials. They use this information to make any needed revisions.

- **Revise instruction.** Anything in the instruction may be revised based on feedback from the formative and summative activities.

- **Optional: Summatively evaluate instruction.** An optional, postdesign step is evaluating the instruction to make decisions about adopting or continuing it by gauging how well it meets current needs. Depending on the findings at this step, designers may recommend further changes to the instruction or the way it is implemented. Technically, this is not a step in the design model, though it is often listed as such.

Check Your Understanding 1.6

**Objective 6 Exercise—Instructional Problems Addressed by Instructional Design Processes.** Analyze each of the following scenarios by identifying problems it reflects and characteristics of the instructional design approach used in this textbook that might have prevented the problem.

- Identify one or more possible problems that caused instruction to fail.
- Identify one or more instructional design steps that could help make instruction more successful.

1. Although all of the teachers at the Happy Hills Elementary School had been trained in Internet use in district workshops, none of them was using online activities in their classrooms. The principal assumed the district-level instruction had not been

(Continued)
effective, and assigned the Media Specialist to do a well-designed sequence of instruction on Internet use. The Media Specialist developed a very good instructional unit on Internet skills. After they went through the unit, all of the teachers demonstrated they knew how to get onto and use the Internet in their teaching. However, as of the end of the school year, they still were not using the Internet in their classrooms. One teacher confided to the Media Specialist that she and the other teachers knew how to use the Internet, but they knew the district frequently brought down the system for maintenance during school and they couldn’t be sure it would be up when they needed it.

2. Ms. Phibus was having great difficulty teaching her third-grade students to do word problems having to do with money. Many children in her class had recently moved to the United States from Mexico. She had tested them and they seemed to have a good grasp of arithmetic and math facts. Yet the errors they made on these problems seemed to be arithmetic errors. One day, one of the students timidly put up his hand and asked, “Ms. Phibus, is a dollar the same as a peso?”

3. The personnel in the Apex Insurance Company always hated their required training sessions whenever a new version of the company’s software came out. The training manager required that each participant demonstrate they achieved the objectives of the training, so everyone had to take a test over the material covered in the sessions. Because there were so many personnel being trained, the tests were scored on a scanning machine and the data sent to the President’s office in a report. If any personnel failed the test, they would not receive credit for the training unless they took remedial training on their own time. Many workers failed the sessions the first time around; most said the situation was unfair. The skills taught in the sessions emphasized hands-on, practical skills in which they used the software, which all of them said they knew they could do. Yet they couldn’t pass the paper-and-pencil tests that asked them questions about the software and how it was to be used in the field.

4. Mr. Washington was distressed about how little interest his students had in plays. The school was in a town with several theater groups, and he was active in most of them. He himself loved reading and acting in plays and wanted to impart this love to his students. However, he felt that before they could appreciate a good play, they needed the proper grounding in the fundamentals. So when he taught about plays, he began the unit by having his students read one of his favorite plays and identify the parts of it (e.g., characters, plot, subplots). If they could not identify the parts, he went through it with them and pointed the parts out, then gave them another play to read. Most of the time, students were so turned off by the second “dissection,” they were finding ways to miss his class. None of his students expressed any love for plays after his “play unit.”

5. Dr. Ortega was Training Manager for an international consulting company. He developed a series of online lessons to teach employees how to use the company’s online research tools to gather information for their projects. Employees could go through these units by themselves wherever they were and learn how to take advantage of the company’s Internet resources to help them locate information for their products and reports. Dr. Ortega was very knowledgeable in this subject matter, and students expressed high interest in this type of instruction. However, after the materials were posted and the first groups of students used them, it was apparent many weren’t learning the skills. Some had trouble following the directions for how to access the instruction. Others said they weren’t clear on where to locate materials in the course space.
Information for Novice Designers

Just as with most complex skills, the approach designers use when they first practice instructional design methods is very different from what they will do when they have more experience. To learn to use an ID model and the processes it describes, novice or apprentice instructional designers must practice it—often in incremental steps. Some of the steps in the design process may require engaging in some fairly unfamiliar and analytical ways of looking at the elements of good instruction. Consequently, practicing design activities may be time consuming, and the steps and products may seem “compartmentalized.” But for learning complex skills in any endeavor—from learning to play tennis to engaging in high levels of scientific research—practicing each component of the learning process is necessary, may be time intensive, and requires focused attention. And, the more the “learner” applies himself, the more fluent and efficient the learner becomes. This is also true for learning to design effective instruction. The more practiced you become in the individual components of the instructional design model, the more skillful you will become in planning for and developing instruction that achieves desired results.

Characteristics of Design Documents. Each step in the design process produces a part of an instructional design. The first steps produce a document that describes specifications for the design; later steps produce the materials based on this “blueprint.” Students will learn most from this text if they apply what they read and create their own instructional design planning document and instructional materials. Depending on the length of the semester and the availability of a student group to try out the instruction, they may also complete formative evaluation and revision steps. The design documents they produce in real-world situations may be more detailed or less so, depending on the requirements and constraints of the design environment.

Contrast with Lesson Plans. ID calls for more intense analysis and more detailed documentation than lesson plans. While both ID documents and lessons plans are documentation of instructional plans, they may be contrasted in the following ways, which will always hold true, no matter what the designer’s experience level:

• Purposes. ID documents show how the instructional unit was created and how the instructional activities came about, while lesson plans show only how the instruction should be carried out.
• Contents. ID documents show not only the goals, objectives, and instructional and assessment activities, as lesson plans do, they also show the analyses on which the instructional activities were based and the formative evaluation or field-testing plans.
• Uses. ID documents act as blueprints for how the instruction should be created and communicate primarily to the design team members and the clients. Lesson plans are documentation required by school districts and are used primarily to evaluate teachers and communicate with substitute teachers.
• Emphases. The emphasis in ID documents is on replicability by using learning objects or self-contained, single-purpose instructional components that can be reused a number of times in different learning contexts (Nash, 2012; Wiley, 2000). These may be as simple as an online game or exercise or as complicated as an interactive simulation. Each serves to make instruction more replicable, no matter who implements it. Lesson plans focus on documenting the use of already-available materials and instructor actions to carry out instruction. Chapter 7 will give more detail on the design and purpose of learning objects.
Check Your Understanding 1.7

Objective 7 Exercise—Comparison of Novice and Expert Approaches to Using a Systematic Approach. Compare the skill levels of those learning instructional design from this textbook (novice designer or ND) to those of experienced designers (ED) by labeling each of the following as ND+ED or ED-only.

_____
Learn how to adapt the model to various design situations.

_____
Create a product at each step in the instructional design model.

_____
Become highly efficient in the use of a systematic instructional design approach.

_____
Create a design document that acts as a blueprint for how instruction will be created.

_____
Create a design document that shows analyses on which instructional activities are based.

_____
Create a design that calls for development of learning objects.

✓ Click here for suggested answers

Sample Student Projects

Before selecting a topic for your own product, see the Sample Student Projects for four examples of how novice designers accomplished these procedures for their own projects.

Chapter 1 Summary

• Systematic instructional design, the topic of this book, is a set of procedures for planning and developing teaching methods and materials to help make sure they achieve desired results.

• Systematic instructional design is based on the ADDIE design paradigm, a general term for all design models that consist of five phases: analysis, design, development, implementation, and evaluation. The approach began in the 1960s as a way to create effective instruction more efficiently and has evolved specific steps and techniques over the years.

• All systematic models call for: intense planning and documentation cycles; aligning objectives, assessments, and instructional strategies; creating materials and developing media; and a tryout-and-revision cycle.

• Criticism of some systematic design models are that they: take too long; ask designers to follow steps blindly; fail to train today’s workforce in required learning-to-learn skills; and provide little or no guidance on design of learning environments.

• Essential characteristics of a design process to meet today’s instructional design/developments needs must: focus on solving a problem; be an orderly but flexible activity; incorporate what we know about effective teaching and learning; confirm that the instructional system works; and provide assistance in using new technologies for learning.

• The design model to be described includes three phases or steps, each of which has several substeps. These are: analysis (identify instructional problems and state goals, analyze goals, and state objectives and assessment strategies); design, development, and implementation (design and develop assessment instruments; design and
develop instructional strategies, materials, and media; and implement learning environment); and evaluation (formative evaluation, revision, and summative evaluation).

- Instructional design methods require documentation that differs from lesson plans, and methods for novice designers differ from those of experienced designers.

References


Chapter 1 Exercises

Exercise 1.2: Questions for Thought and Discussion—These questions may be used for small-group or class discussion or may be subjects for individual or group activities. Take part in these discussions in your in-person class meeting, or use your instructor-provided online discussion area or blog.

a. According to Zemke and Rossett (2002a), some experts argue that instructional design (i.e., instructional systems design or ISD) should be more prescriptive. They quote respected instructional designer M. David Merrill as saying that “ISD is essentially a series of empty boxes, and we need more content for those boxes . . . A Shakespearean sonnet is very prescriptive, very precise. Yet writing a sonnet is a very creative act. There’s nothing wrong with the right prescriptions” (p. 30). Should instructional design be highly prescriptive as to its steps or should it simply provide guidelines? Give arguments defending each position.

b. Gordon and Zemke (2000) point out that “Personal development gurus have turned up their noses at the narrowness of ISD’s ambitions, dedicated as it is to teaching people to do specific jobs instead of expanding their mental horizons or transfiguring their lives” (p. 44). For what educational purposes can instructional design serve a meaningful role? From what you have read so far about instructional design processes, do you feel they preclude instruction that expands students’ “mental horizons”?

Exercise 1.3: Design Project Activities—As you develop your instructional product for this course, use the following information to guide your work. Begin thinking about a topic for which you would like to design an instructional package. Remember that what you design for this course may have to meet different criteria than what you will design when you have more facility in using the model and when you are not as time limited. Use the following checklist to help you decide on an appropriate topic.

1. The topic would lend itself to about an hour or two of instruction.
2. It is in an area in which the fundamental concepts will not change rapidly.
3. You are a content area expert in this area.
4. You have access to a group of students (your own or others) to field-test the instruction.
5. A semester will be enough time to develop the required media and materials (since developing at least one kind of media or material is a required part of the design project).
Chapter 2

Analyzing Needs and Identifying Instructional Goals

*The engineer’s first problem in any design solution is to discover what the problem really is.*
—Unknown

Chapter 2 Topics

- Why assessing needs is a necessary first step in instructional design
- Analyzing situations to identify problems
- Stating instructional goals based on performance needs
- Steps in doing a needs assessment
- How to avoid common problems in assessing needs
- How to avoid common problems in writing instructional goals

Chapter 2 Learning Outcomes

1. Identify purposes that needs assessment can serve.
2. Decide on the needs assessment model and documentation appropriate for given situations.
3. Identify characteristics that given instructional goals need to meet required criteria.
4. Identify and sequence steps in a needs assessment.
5. For each of several scenarios, identify the needs assessment issue or problem that may prevent designers from getting at the real problem.
6. Identify instructional goals that are not stated appropriately, tell what is wrong with them, and correct them.
SCENARIO

How do you know it’s a training problem?

Arvis Belt, superintendent of Wilco County Independent Schools, was meeting with three of her administrators and a visitor. As they sat down at the conference room table, Ed Dabayvick, Assistant Superintendent for Information Systems, spoke first. “Good morning and thanks for agreeing to meet today about the SpecEd training I’m recommending. I’d like to introduce our visitor to you. Say hello to Lee Servatius, one of the top instructional designers for the BestTrain Consulting Group here in the city. I think you know their work from the workshop series for principals they did for us last year. Lee, this is our new superintendent Arvis Belt, our Director of Special Education, May Chou, and our Director of Student Services, Howard Washington.”

After greetings were exchanged, Ed spoke again. “As I said in my memo, I think we have a training problem on our hands, and Lee is just the one who can help us solve it. The SpecEd system has been fully installed and operational now for over six months, yet only about 20 percent of our schools are making use of all the modules. The training workshops and online help system that came with the package obviously have not been enough. I’ve asked Lee here to look into designing an online course for us so that our school people could access it at their convenience.”

Lee noticed that May and Howard exchanged worried looks before Howard began to speak. “Well, now, Ed, I have nothing against more training, as I’ve told you, and I certainly have a great deal of respect for BestTrain. I was thinking, though, that before we begin more training, perhaps we should address some of the performance issues some of our schools have raised?”

Ed flushed slightly, straightened up in his chair, and placed his right hand on the SpecEd manual. “Howard, this system is acknowledged to be the best in the country. You know how many other large districts are using it, and it’s a central piece in our effort to comply with federal mandates on special education recordkeeping. I think our principals just don’t like to change from the old system. But, as much taxpayer funds as we spent on SpecEd, they must begin using it. That has to be our primary goal this year.”

Arvis smiled and said, “I know this system was in place before I arrived, and I’ve certainly heard good things about it elsewhere around the country. But I’d like to hear what our principals are saying, too.” Turning to Ed, she said, “Isn’t our primary goal really to make it easier for our schools to support their special education units and give students better service? Maybe there is some reason behind why they’re not using it optimally, rather than just reluctance to change.”

As Ed was about to speak again, Lee, the instructional designer, interjected, “You know, Ed, I may be able to help. If you’re willing to spend a little time on some preliminary work, I could talk with the principals, gather some information, and get back to you in a couple weeks with recommendations on next steps. Might save us some time on identifying training needs.”

“That sounds like a great idea, Lee!” said Lynn, beaming. “Ed, why don’t you send the principals an e-mail introducing Lee? Howard and May can help organize things at the school level. We’ll plan to meet here again at the end of the month and talk about next steps.”
BACKGROUND ON NEEDS ASSESSMENT AND GOAL-SETTING STRATEGIES

This chapter begins a description of the first steps in the systematic model of designing instruction, introduced in Chapter 1. This section reviews background and essential characteristics of the first step in the model: analyzing needs and stating instructional goals.

Listen to Learn How Needs Assessment and Goal-Setting Improve Instruction

A Review of Needs Assessment Rationales and Techniques

In the foundational text *Analyzing Performance Problems* (1997), Mager and Pipe said that “Solutions to problems are like keys in locks; they don’t work if they don’t fit” (p. v). Systematic design of new instructional materials has proven to be an effective solution for many training problems. However, as the Wilco County *SpecEd* scenario at the beginning of this chapter shows, even worse than having a training problem and no instruction to solve it is having instruction with no training problem to solve. That is why an essential first step in instructional design is confirming whether or not an instructional design solution is a good “fit” with the problem. This first step requires answering four questions:

1. What is the problem?
2. If the problem is a human performance one, is instruction the best solution?
3. If the solution is instruction, is systematic instructional design the best way to provide it?
4. If an instructional design approach is feasible, what should be the instructional goals?

The process of answering these critical questions in response to problems and discovering the gaps between current and desired results is known as *needs assessment* (Swart & Kaufman, 2009) and, though an invaluable preface to deciding on appropriate solutions for problems, it is often difficult to convince people that it is important. Two primary reasons account for this difficulty: (1) Needs assessment takes time and resources, and (2) human nature is such that people tend to jump to solutions, rather than taking time to explore the nature of the problem. However, though needs assessments can cost an organization in time and resources, Muller and Roberts (2010) observe that skipping the needs assessment step is often more expensive than completing it. If needs assessment is omitted and the subsequent instruction proves to make little or no difference in bringing about the desired change, the organization will have wasted its resources on a solution that does not work. Muller and Roberts also note that there are many ways to answer needs assessment questions, some of which are quick, easy, and much less inexpensive than a comprehensive needs assessment.

In the scenario that opened this chapter, the instructional designer is suggesting a cursory needs assessment: interviewing people in Wilco County schools to find out why they are not using the *SpecEd* system. The answer may, indeed, be that they were not properly trained and need new instructional goals, or statements of performance deficits that could be remedied through instruction. But other causes for the performance problem are possible. For example, as the Special Education Director suggested, there may be problems with the *SpecEd* system that makes it difficult to use.
The system itself may not be designed to solve the *real* performance problem: helping schools provide better service to students. Though others may be pressing to jump to an instructional solution, the instructional designer is usually the one responsible for making sure it is a good fit for the problem. If not, the personnel who hired the designer may find that their money and time were wasted, and the problem remains.

Terms often used in place of or closely related to needs assessment include: *front-end analysis*, *needs analysis* or *training needs analysis*, and *performance analysis*. In instructional design literature, each of these terms is sometimes differentiated from needs assessment and sometimes used interchangeably with it. In this discussion, the term *needs assessment* is used as stated earlier: discovering the gaps between current and desired results. Front-end analysis is addressed in this text as a process that follows needs assessment (see Chapter 3).

**IDENTIFYING THE REAL PROBLEM.** Identifying the real performance problem in a given situation is often difficult even when there is sufficient time. In the opening scenario, Ed Dabayvick clearly feels training has been inadequate. He *wants* better instruction, but is that a real *need*? He has identified the desired goal as “getting the schools to use the SpecEd system,” but is that the goal that will lead to an improved environment or is it just a means to a more important end (improved service to students)? Obtaining useful results depends upon answering these questions, which are impossible to answer without further information.

In the case of the Wilco County school personnel, the real need is providing better, timely service to students with special needs and/or being able to keep up with paperwork better. The personnel may believe the SpecEd system is not capable of meeting this need and, even though the system was purchased at great expense to the district, it may be that it is a flawed solution to the real need. For example, Hiruma, Sivo, and Pounds (2012) did a needs assessment to determine why virtual school students were failing state exams after courses. Only when they found that a gap in teacher preparation was the problem did they decide on an appropriate solution.
Once they determined that new instruction was needed and knew the target audience for that instruction, they used systematic methods to design two online teacher development courses.

**DETERMINING THE BEST SOLUTION.** Even if a performance problem is identified, it may not require an instructional solution. There are a number of reasons besides lack of skills that people fail to do what is expected of them. Sometimes they don't have the right tools or the tools they have are not working properly. Sometimes people could do a skill at one time, but they just have not had recent exposure to it and/or practice with it. Learners may also fail to perform as expected for many of these same reasons. For example, students sometimes do not pass important tests because they lack motivation or insight into the reasons they need to learn; or they learn a skill but have no opportunity to practice it until weeks or months later on the exam, and by then they have forgotten it.

If personnel cannot do a desired performance, sometimes systematically designed instruction, which usually requires considerable resources and time to develop media and materials, is still not the best solution. A cheaper or faster solution may be a better one. If many of the Wilco County personnel really lack the skills they need to use the system, it may be that fewer people need to interface with the system so that they can receive individual training from a company representative, or that more help manuals need to be made available to them so they can look up key information themselves. A thorough needs assessment identifies both the real problem and the type of solution that will be most feasible to implement.

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**Check Your Understanding 2.1**

**Objective 1 Exercise—Purposes of Needs Assessment.** From the list of items below, place a checkmark beside those that are purposes a needs assessment can fulfill.

- Prevents having to do a complete front-end analysis
- May establish if the solution should be instructional or noninstructional
- Identifies the most appropriate people to include on a design team
- Pinpoints gaps between current and desired results
- Helps differentiate between wants and needs
- Identifies which solution to the problem is most feasible
- Provides insights into reasons people lack needed skills
- Identifies whether or not problems are human performance ones
- Helps prevent jumping to solutions before the problem is identified
- Specifies time and resources needed for instructional design

[Click here for suggested answers]

**Essential Characteristics of Needs Assessment Processes**

Although designers are often asked to play a key role in identifying problems and determining best solutions, the approach they use varies considerably from one situation to another. This section addresses how to select and carry out types or models of needs assessments that match the requirements of the situation.

**NEEDS ASSESSMENT MODELS.** As the SpecEd scenario illustrates, instructional designers who are brought in as consultants or who are working in their role as training directors are often called upon to solve problems that are presented to them as
“training needs” or “instructional needs.” At this point, their first step is to do a needs assessment, but depending on the situation, they do not always have to start at the very beginning. For example, when the decision has already been made to transfer an in-person course to an online or blended environment, the nature of the problem has already been established, and the designer’s role is much clearer. The only needs assessment issue the designer may face is stating instructional goals, if the original course did not already state them adequately.

Clearly then, there is more than one type of needs assessment, and which type a designer uses depends upon the situation and the nature of the problem. As McCallum (2008) observes, every field may require its own needs assessment procedures because “The process selected is dependent upon the desired goals and the intended outcomes as identified by the stakeholders” (p. 19). Two general types or models of needs assessment are discussed here in terms of when each is an appropriate choice. Sometimes, designers must do both. Figure 2.1 shows how to decide which is needed and how these processes fit together.

**Model 1: Performance analysis.** This model is appropriate for situations where the problem is clearly one involving desired versus actual performance, but the source of the problem preventing desired performance is not clear. This kind of needs assessment, performance analysis, is sometimes described as a step preceding instructional design, but in fact, it may be done in place of it, if the analysis reveals a problem that cannot be addressed by instruction. Performance analysis came out of the work of Thomas Gilbert (2007) on human performance improvement (also known as human performance technology), which focused on making organizations more productive and successful by improving their workforce. Swart and Kaufman (2009) say that the result of a performance analysis is a performance need or gap between current performance and the desired performance that will further the goals of the organization. Thus, to identify the nature of the gap, the designer begins by reviewing the goals of the organization, as identified in its documents and by people within the organization. Organizational documents (e.g., mission statements, policy and procedures manuals, reports) also provide insight on how the organization has worked to achieve its goals. Finally, the designer may use interviews, discussions with personnel in or related to the organization, and/or surveys to determine how well the goals are being met. The aim of all these activities is to determine the true source of the problem and arrive at a solution that is both feasible to implement (i.e., within current resource and time constraints) and effective in addressing the performance need.
• **Model 2: Instructional needs analysis.** When the problem is clearly one that must be addressed by instruction (e.g., when a course needs to be updated or an organization wants an existing course transferred to an online format), yet another kind of needs assessment is required: an *instructional needs analysis*. This activity helps make two kinds of decisions: which goals the instruction should include and which kind of instructional design process is feasible. To make the first kind of decision, the designer examines current goals and standards the course should address and creates goal statements that will serve as the foundation of the instruction. Before proceeding further, designers usually ask personnel in the organization to review the goals and make any needed additions or corrections.

Finally, yet another set of decisions must be made. The systematic instructional design approach takes time, resources, and skills to implement. Therefore, the designer must ask the following questions to determine what is feasible for the situation. Systematic methods are the choice if an instructional needs analysis can satisfactorily answer each of the following questions. If answers are unclear or if the answer is “no,” some modifications to the most-desired systematic approach may be necessary:

- **How much time and support are available for designing instructional materials?** The organization must be willing to support an instructional designer and/or an instructional design team as they create instruction. This may mean allocating special funds for the design effort or releasing personnel from other duties to serve on a design team. Sometimes a rigorous instructional design process simply is not possible and a modified design process must be used to address the problem.

- **Will the topic allow for easy updates to instruction later?** The designer must confirm that time spent on instructional design is a cost-effective investment; that is, instruction will not need to be completely redesigned every few months. In this fast-paced technology age, it is difficult to find many topics that will not change at all over time. However, instruction can be designed in ways that allow easy updates to details. For example, different versions of a software package may be released every two years, but the differences are usually in terms of added functions and different appearance features. If instruction is created to be online rather than in print, these updates can be made quickly and easily while preserving the basic structure of the material.

- **Will designers have access to critical information during design work?** Designers must either be experts in the content of the instruction, or they must have access to those who are. When designing instruction for a workplace, designers often must be able to observe workers doing the tasks and obtain first-hand information on what constitutes a good performance. Sometimes a *job analysis* is needed, which is identifying steps to accomplish each of the tasks a given worker does in his/her role in the organization. This may require someone to observe the worker and document tasks and how they are accomplished.

- **Will those who need the instruction be available to use it after it is designed?** Even though personnel may need instruction, they may not be able to be released to participate in it. Designers have to confirm that instruction will be used after it is made available.

**Needs Assessment Documentation.** Depending on the situation and the type of needs assessment, the designer may be asked to produce a report to document the performance problems(s) and recommended solutions. Documentation of the
Part I • Analysis

performance problem and justification for a given solution may be needed in organizations where decision makers must justify costs and other resources. If the problem is one that instruction can address, then the document reports the instructional goals. It is usual to ask key personnel in the organization to review the goals and recommend changes or additions before proceeding to the next design step.

Check Your Understanding 2.2

Objective 2 Exercise—Needs Assessment Models and Documentation. For each of the following situations, identify an appropriate needs assessment model to begin with (1, 2), and identify what documentation would be needed (report to justify a given solution, instructional goals, or possibly both—i.e., PB). Circle the model and place checkmarks to indicate needed documentation.

<table>
<thead>
<tr>
<th>Needed Documentation</th>
<th>Model (Circle one)</th>
<th>Report</th>
<th>Goals</th>
<th>PB</th>
<th>Situations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) 1 2</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>You are an instructional designer for Highpress Consultants. A small private college wants your company to develop an online training program for its faculty members, who have resisted developing online courses. The college feels better-trained faculty would help it achieve its desire to have a bigger online course offering.</td>
</tr>
<tr>
<td></td>
<td>(2) 1 2</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A small company has hired your design company to transfer its HR benefits-training workshop to an online format. It would like to make the training more accessible and convenient for its personnel.</td>
</tr>
<tr>
<td></td>
<td>(3) 1 2</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>You are a designer in the human resources and training department of a large discount store chain. The director of the division responsible for fulfilling customers' online orders finds that fulfillment often lags orders in many locations around the country. He requests that you create a training program for fulfillment personnel to increase their productivity.</td>
</tr>
</tbody>
</table>

Essential Characteristics of Instructional Goals

Once an instructional designer determines that instruction is, indeed, the most appropriate solution to the problem, design tasks may begin. The first task is to state the needs in terms of desired performances. For some situations where the need is clearly that of instruction, desired performance gaps are also clear, and instructional goals may be written to address those gaps. In other cases, designers may need to collect more information or observe workers to determine how to state desired performances. These performance statements become the instructional goals. This section addresses
how to write these goal statements in a way that makes them useful for further design work. Each instructional goal should meet three criteria: It must state an observable performance, the type of learning must be clear, and it must include the criteria required to meet the goal in an educational or training context.

**WRITE GOALS IN TERMS OF LEARNED PERFORMANCES.** To be most useful for later design, the designer must state each instructional goal in terms of an action the students will do after instruction to demonstrate they have learned. Learning is an internal process that cannot be directly observed, but performances are external and observable by others. Therefore, it is essential that goals contain a verb that identifies an observable action and an object or content of the action. (Later, criteria will be added to these statements.) Table 2.1 gives some examples of internal learned abilities and statements of external performances that meet these requirements. The first and most important criterion for goal statements is to use words that connote observable actions. For example, avoid words such as know, understand, really understand, and appreciate. Note the difference between the “internal-condition” verbs in column 1 of Table 2.1 and the “external-action” verbs in column 2.

**CATEGORIZE GOALS ACCORDING TO TYPES OF LEARNED PERFORMANCES.** Several learning theorists have created taxonomies of learned abilities or categories based on analyses of the scope of learning outcomes. It is important to identify which type the goal represents because different types of learning require different instructional strategies.

**TABLE 2.1 Example Learned Abilities and Statements of Observable Performances**

<table>
<thead>
<tr>
<th>Learned Ability Stated as Internal Process</th>
<th>Learned Ability Stated as External Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knows when customers need assistance</td>
<td>Discriminates between customers that do and do not need assistance</td>
</tr>
<tr>
<td>Understands the difference between links and nonlinks on a web page</td>
<td>Classifies web page objects as links or nonlinks by their appearance</td>
</tr>
<tr>
<td>Knows the difference between types of sentence structures</td>
<td>Identifies sentences as simple, compound, complex, or compound–complex</td>
</tr>
<tr>
<td>Knows how to use AutoCAD to create 3-D planes in space</td>
<td>Demonstrates the procedure for using AutoCAD to create a 3-D plane in space</td>
</tr>
<tr>
<td>Knows how to summarize a product in order to sell it effectively</td>
<td>Generates an effective sales summary for a given product</td>
</tr>
<tr>
<td>Knows symbols for chemical elements from the periodic table</td>
<td>States the element for any given symbol from the periodic table</td>
</tr>
<tr>
<td>Memorizes the names for machinists’ tools</td>
<td>States the correct name when given an image of any tool in the machinist’s workbench</td>
</tr>
<tr>
<td>Knows the alphabet by heart</td>
<td>States all the letters in alphabetical order</td>
</tr>
<tr>
<td>Knows how to work well in a small group</td>
<td>Adopts successful strategies for collaborative small-group work</td>
</tr>
<tr>
<td>Is fast at computer keyboarding</td>
<td>Executes a keyboarding exercise at a minimum of 60 WPM</td>
</tr>
<tr>
<td>Understands the importance of being drug free</td>
<td>Chooses to refrain from taking drugs</td>
</tr>
</tbody>
</table>
The most common of these are Bloom’s Taxonomy of Educational Objectives (Anderson et al., 2001; Bloom, 1984; Krathwohl, Bloom, & Masia, 1971) and Gagné’s Categories of Learned Capabilities (Gagné, 1985; Gagné, Briggs, & Wager, 1992).

Bloom was the first to state types of learned outcomes. He and his colleagues based this taxonomy on analyses of objectives that students in various settings were required to learn. The main categories in his taxonomy are cognitive, affective, and psychomotor domains. Each is broken down further into subcategories. The most widely used by instructional designers are the cognitive categories, which were originally: knowledge, comprehension, application, analysis, synthesis, and evaluation. A later revision of the taxonomy by Anderson et al. (2001) listed subcategories as knowledge, comprehension, application, analysis, evaluation, and creation.

Gagné derived his categorization of capabilities based on the way people mentally process them and store them in memory. These types are: intellectual skills, verbal information, cognitive strategies, motor skills, and attitudes. He further divided intellectual skills and verbal information into more specific skills. Intellectual skills were: discrimination, concrete concepts, defined concepts, rule using, and problem solving. Verbal information subcategories were: label, facts, and connected discourse. (See more on these subcategories in Chapter 3.)

Several authors have attempted to correlate Bloom’s Taxonomy and Gagné’s Categories. Table 2.2 and Table 2.3 are based on the work on Anderson et al. (2001) and Koohang and Harman (2007), though it should be noted that categories here differ from their analysis in some cases. Note that Gagné’s Verbal Information category corresponds most closely to a subcategory in Bloom’s Cognitive domain: Remembering.

Because Gagné was able to demonstrate that each type of learned capability required different instructional conditions to foster it, his categories are especially well suited for use in an instructional design model. He found it useful to use a specific verb to designate the type of learning. Bloom’s approach was to take the performance

<table>
<thead>
<tr>
<th>TABLE 2.2 Comparison of Gagné’s Categories and Bloom’s Taxonomy Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gagné’s Categories</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Intellectual skills</td>
</tr>
<tr>
<td>Verbal information skills</td>
</tr>
<tr>
<td>Cognitive strategies</td>
</tr>
<tr>
<td>Motor skills</td>
</tr>
<tr>
<td>Attitudes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 2.3 Comparison of Gagné’s Intellectual Skills and Bloom’s Cognitive Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gagné’s Categories: Intellectual Skill Subcategories</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Discriminations, concrete concepts, and defined concepts</td>
</tr>
<tr>
<td>Rule using</td>
</tr>
<tr>
<td>Problem solving</td>
</tr>
<tr>
<td>Cognitive strategies</td>
</tr>
</tbody>
</table>
verbs already in use in the field and place them under the domains. Any verb works, as long as the designer is able to classify which type of learning the instructional goal represents. See Table 2.4 for a summary of the types of skills and action verbs commonly used to denote each type that could be used for instructional goals.

In choosing the type of learning to express in the instructional goal, it is usually best to stay at the domain or category level, because a task analysis or content analysis (discussed in Chapter 3) will reveal the subcategories of skills required to achieve the goal. A brief summary of these skills is given here to help inform this decision.

- **Intellectual skills (Bloom’s Cognitive domain).** Gagné et al. (1992) say that, unlike other types of learned performance, “An intellectual skill makes it possible for an individual to respond to his environment through symbols” (p. 53). For example, words, numbers, and even sounds can stand for objects or ideas. Gagné et al. say this use of symbols takes five forms that increase in complexity according to the mental processes people must use to accomplish them. Although all five are listed in Table 2.2 and Table 2.3, designers often consider only three general types to differ enough to affect design of instruction: concepts, rules, and problem solving.

- **Verbal information category (Bloom’s Cognitive domain—Remembering subdomain).** No matter what the content area, there are many items that people must simply memorize and be able to recite by heart. This is not because it

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**TABLE 2.4 Types of Learned Capabilities and Verbs to Designate Each**

<table>
<thead>
<tr>
<th>Bloom’s Domains*</th>
<th>Gagne’s Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain/Subdomain</td>
<td>Verbs</td>
</tr>
<tr>
<td>Cognitive:</td>
<td></td>
</tr>
<tr>
<td>• Remembering</td>
<td>Count, define, label, list, name, quote, recall, recite</td>
</tr>
<tr>
<td>• Understanding</td>
<td>Demonstrate, discuss, explain, summarize, tell</td>
</tr>
<tr>
<td>• Applying</td>
<td>Apply, compute, produce, show, transfer, use</td>
</tr>
<tr>
<td>• Analyzing</td>
<td>Analyze, compare, contrast, deduce, diagram</td>
</tr>
<tr>
<td>• Evaluating</td>
<td>Appraise, defend, judge, support, evaluate</td>
</tr>
<tr>
<td>• Creating</td>
<td>Construct, create, design, write</td>
</tr>
<tr>
<td>Affective</td>
<td>Choose, act</td>
</tr>
<tr>
<td>Psychomotor</td>
<td>Assemble, fix, carry out, construct, perform</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*New domains based on Anderson et al. (2001) revision.*
is easy knowledge to test, as constructivists sometimes maintain, but because it makes it easier and faster for people to learn more about the content and to communicate what they know to others. Gagné et al. identify three different kinds of verbal knowledge: labels, facts, and organized knowledge or verbal chains. As Gagné et al. are quick to point out, memorizing these items is not the same as knowing the meaning behind them. However, having to look them up every time one needs them would impede learning meaning and application skills.

- **Cognitive strategies category (Bloom’s Cognitive domain—Creating subdomain).** Gagné et al. say that, in addition to learning content skills and knowledge, people also can learn general strategies for learning and for remembering what they learn. They say that cognitive strategies are control processes by which learners “select and modify their ways of attending, learning, remembering, and thinking” (p. 66). Cognitive strategies can be organizing (e.g., figuring out ways to remember large amounts of material), metacognitive (e.g., teaching oneself to teaching oneself to get the most out of reading by using certain standard questions), or affective (e.g., teaching oneself to focus attention and manage time). Being able to work well in a small group may require several of these types of cognitive strategies.

- **Motor skills category (Bloom’s Psychomotor domain).** These are abilities to perform physical acts with “rapidity, accuracy, force, or smoothness” (Gagné et al. (1992), p. 92). Examples of motor (short for psychomotor) skills include: holding a pencil and forming letters correctly, executing a backhand in tennis, and typing at a given speed on a keyboard or typewriter.

- **Attitudes (Bloom’s Affective domain).** Shaping the way people feel about an activity or about other people has always been an important part of school learning, but it is becoming even more so in today’s society. For example, we not only want people to learn how drugs work in the human body (intellectual skills), we also want them to form intentions about how they will react if someone offers them drugs. Character education is an area of school curriculum in which many goals focus on forming attitudes.

**SETTING PERFORMANCE CRITERIA FOR INSTRUCTIONAL GOALS.** The final step in stating instructional goals is to include a criterion that will indicate to an organization that the goal has been successfully achieved. It is important to note that this is not an individual goal, but a group one. Because groups usually contain people of all ability levels and assessments are always subject to measurement error, it is rare that 100 percent of students will be able to meet a given goal. But, in some cases, the goal is so easy to learn or so foundational to further learning that 100 percent of participants should be able to attain it. Designers may set the performance criterion based on past experience with this kind of knowledge and the percentage of successful students that would be an adequate indication the instruction is working as it should.

However, performance criteria are important indicators of program success and, thus, provide a basis for summative evaluation (see Chapter 10) of a program’s impact. Due to this reality, overall performance criteria for all instructional goals are often set by the organization itself or by agencies to which the organization reports. For example, the original No Child Left Behind Act of 2001 specified that in order to meet Adequate Yearly Progress (AYP) certain percentages of students had to pass tests in core content areas, and those percentages were to increase until in 2014, 100 percent of students would have to meet achievement criteria (Choi, Seltzer, Herman, & Yamashiro, 2007). It is common for large companies to stipulate required criteria for workers to get credit or certification as a result of training. Designers must determine organizational requirements in order to set final performance criteria for instructional goals. Table 2.5 shows examples of final performance goals that meet all three criteria, including group performance criteria.
TABLE 2.5 Examples of Instructional Design Goals

In an entry-level submarine crew training course for communications specialists, 95 percent of the trainees can discriminate between sonar emitted by U.S. submarines and submarines of other countries.

In a Grade 4 class, 90 percent of students can identify sentences as simple, compound, complex, or compound–complex.

Ninety percent of engineering workshop participants can demonstrate the procedure for using AutoCAD to create a 3-D plane in space.

In a GED preparation class, at least 80 percent of students can generate a paragraph that contains all required components.

Ninety-five percent of high school students can state the element for any given symbol from the periodic table.

Ninety percent of fifth-grade students can label the name of any given U.S. state from its shape and location on the U.S. map.

In a workshop on small-group collaboration techniques, 90 percent of participants adopt a strategy for successful group work.

Eighty-five percent of keyboarding students can execute a typing exercise at 60 WPM.

In a workforce of 250 workers who have participated in drug prevention workshops, at least 225 choose to remain drug free (as indicated by their responses on a survey).

Check Your Understanding 2.3

Objective 3 Exercise—Characteristics of Instructional Goals. For each of the statements on the right below, identify component(s) it is missing (if any) that would make the statement meet criteria to be useful instructional goals. Place the letter(s) of the missing component(s) listed on the left on the line next to the statement.

Missing (can be any or all):
A. Is stated as a performance.
B. Performance is observable.
C. Criterion for success is given.
D. Nothing is missing.

1. Demonstrate how to find the square footage area of a floor plan from a blueprint.

2. At least 85 percent of students in the undergraduate chemistry class will label chemical elements with correct symbols from the periodic chart.

3. At least 90 percent of students in the SAT prep course will understand the importance of effective study skills.

4. Execute a procedure for transferring a patient from bed to gurney.

5. All students in the architectural structures course will generate a design for a load-bearing wall between two structures.

Click here for suggested answers
COMPLETING A NEEDS ASSESSMENT AND PREPARING INSTRUCTIONAL GOALS

Sample Student Projects

Before doing a needs assessment and writing instructional design goals for your own product, see Sample Student Projects for four examples of how novice designers accomplished these procedures for their own projects.

Procedures for Completing Needs Assessments and Writing Goals

With experience in a number of situations, designers learn to recognize when it is feasible to do a full needs assessment, and when they must use an abbreviated procedure to make a decision about whether or not to proceed with designing instruction. Sometimes the needs assessment has (or has not) been completed, and the designer is simply asked to begin designing instruction. However, most design experts agree that it is foolhardy to make a “go/no go” decision to design instruction in the absence of needs assessment data.

If they do decide to proceed with design work and write instructional goals, designers often have content experts and potential users of the instruction give feedback on the goals and approve them before proceeding with further design work. In your course, your instructor serves this role and reviews your project’s instructional goals. Some designers develop goals and complete an instructional analysis (described in Chapter 3) prior to having anyone review the initial work. The essential aspect of this work is that a thorough analysis of instructional needs has been done and reviewed for accuracy by those who will be responsible for implementing instruction. Novice designers take the following approach to gain experience in analyzing needs and writing instructional goals.

SELECT A NEEDS ASSESSMENT STRATEGY. After focusing on a topic, the designer must decide whether to do a Model 1 or Model 2 needs assessment, or if both may be needed. This step focuses on clarifying the nature of the problem so that subsequent activities will, indeed, address the real need. If a Model 2 needs assessment is selected, designers may skip data collection and statement of need and proceed to state instructional goals. If a Model 1 needs assessment is selected, a designer decides how to gather information to establish the nature of the performance problem and determine whether it requires instruction. They may decide to develop a survey, prepare interview questions, or simply analyze the characteristics of a work or school situation in a way that helps them come to a decision. Naturally, if learners are doing needs assessments in an instructional design course or workshop, they must eventually identify a topic for which instruction is needed and an instructional design is the best way to meet the need. However, if the need is not clear, they can take the following steps to confirm and document that decision.

IDENTIFY THE PROBLEM OR COLLECT DATA. If the nature of the problem is not clear and a Model 1 needs assessment is necessary, designers identify which data will be most useful in clarifying the problem and the most appropriate solution. This may require talking with key personnel, observing workers, examining records and documents, and/or creating and implementing or questionnaires. Although designers may not use the following questions verbatim, the questions they do ask or the procedures they use should be designed to address the following issues.

• What is the problem? They may ask the supervisors “Why do you think your personnel do not use the correct procedure to do the task?” Then they may ask the workers the same thing. Or they may decide to observe the personnel as
they do their work tasks. Meyers and Johnson (2008) recommend involving key personnel in identifying needs, observing that “The necessity of this needs analysis step cannot be underestimated. Knowing the key participants in the planned intervention and their learning and task needs serve a foundational step when creating any instructional or organizational change intervention” (p. 473).

• **If the problem is a human performance one, is instruction the best solution?** Based on the data you collect, you will decide if the problem is one that training could address if the personnel could, in fact, do the performance if something in the environment were changed.

• **If the solution is instruction, is a systematic instructional design approach the best way to provide it?** If instruction could address the need, ask yourself the four questions outlined earlier in this chapter under the section “Model 2: Instructional needs analysis.”

**DOCUMENT THE NEED.** To demonstrate that you understand all relevant needs assessment issues, prepare a document that addresses all of these questions and documents the need. Describe the procedures you used to answer the questions and why you selected those procedures as most appropriate for the situation. Finally, give a summary of the answers you obtained.

**WRITE INSTRUCTIONAL GOALS.** Here designers prepare goal statements for the performance gaps. If exact performances are not yet clear, designers observe workers or review organizational documentation to clarify them. Label each goal as to the type of learning it represents in terms of Gagné categories or Bloom domains. To make sure you are identifying the correct kind of learning, it is helpful to use the appropriate “Gagné verb” or “Bloom verbs” for each type. If the goal is an intellectual skill, it is usually a higher-order skill such as rule using (demonstrate) and problem solving (generate), because lower-level intellectual skills usually are not complex enough to represent unit goals. However, it is usually simpler to begin by stating the instructional goal by general domain (e.g., Cognitive) or category (e.g., Intellectual Skills). A later learning analysis will reveal both the subcategory of skill the goal represents and prerequisite skills that learners must acquire to achieve the goal (see Chapter 3).

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**Check Your Understanding 2.4**

**Objective 4 Exercise—Needs Assessment Steps.** From the following list, select those that are steps in needs assessment and put the steps in correct sequence by placing the appropriate number to the left of each required activity. (Reminder: Some of the steps listed are not needed at all.)

- _____ If the instruction will address a need, write instructional goals.
- _____ Write instructional objectives.
- _____ Select a needs assessment model.
- _____ Write a report that documents the needs.
- _____ Complete a front-end analysis.
- _____ If the problem is unclear, collect data in order to clarify it.
- _____ If Model 3, skip to front-end analysis.

[Click here for suggested answers](#)
RUSHING TO SOLUTIONS. It is a natural human tendency to jump to conclusions; educators have a tendency to arrive at solutions before the problem is clearly defined. Thus, novice designers sometimes ignore or misinterpret data they have collected or they frame a solution in their minds, then try to collect data to confirm it. In the Wilco County SpecEd example at the beginning of this chapter, the county had collected enough data to know that schools were not using the SpecEd system, so they concluded that lack of training must be the problem. The amount of funds they had already spent on the SpecEd system blinded them to the real need in the situation: helping schools provide better service to students. An approach that rushes to solutions in this way may result in identifying the wrong problem or designing instruction for a problem that it is not able to address.

ISSUES IN IDENTIFYING NEEDS DUE TO LACK OF DATA AND/OR DATA INTERPRETATION. In another example, a state office agency with a mission of serving low-income single parents found that new immigrants were not using the local health services available to them. In preliminary data collection on the population, it was found that many of the parents spoke little English and were not able to read flyers announcing the services. Personnel in the agency decided to offer basic literacy classes tailored to this group’s health needs. However, an instructional designer hired to create the instruction collected further information and found that transportation, rather than communication skills, was the real problem. The parents did know about the centers, but centers were located in places they could not get to on foot, and they had no money to take public transportation. The problem was then addressed through a noninstructional solution.

ISSUES IN FRAMING THE PROBLEM. Designers can avoid identifying the wrong problem by focusing on Swart and Kaufman’s (2009) direction to identify a need as a gap between current performance and the desired performance and by framing this gap in a way that reflects an open mind about possible solutions. They say this requires stating the problem in “solution-free” terms. For example, in the case of the state agency described earlier, the problem stated to the designer was “Low-income parents cannot read the notices sent to them about health care options.” While this was true, the problem was framed too narrowly; as a result, the problem statement itself had a built-in solution. The real problem was that “Low-income parents are not getting health care that could improve their health and that of their families.” Stating the problem in a solution-free way allows for data collection that will be able to get at the real problem.

POLITICAL CHALLENGES. All decision making in an organization such as a school district, university, business, or medical facility takes place in a political context. Sometimes political realities get in the way of a designer’s efforts to get at the real problem. In the Wilco County SpecEd scenario, the county already spent a good bit of its funds on a solution that was not working. However, some of the personnel responsible for the decision to purchase the system may feel their credibility—and perhaps their jobs—are on the line. In the Wilco County scenario, the arrival of a new superintendent presented an opportunity to rethink the problem and arrive at a good solution. But in many such situations, designers may be faced with the challenge of doing meaningful needs assessment in the face of resistance by key members of the organization. In these cases, designers must work with the organization, engage in
diplomacy, and keep communication lines open. Though they may not be able to do the job they would like to do, their primary goals should be to serve the organization as best they can, even when political realities trump assessing needs.

Check Your Understanding 2.5

Objective 5 Exercise—Needs Assessment Issues and Problems. For each of the scenarios on the left, identify the needs assessment issue or problem on the right that may prevent getting at the real need. Place the letter of the issue/problem on the line to the left of the scenario.

Scenarios:

1. The past three years have seen an increase in employee accidents in the parts-assembly area of a large manufacturing plant. The company president has hired you as a consultant to see if better training is needed, but the area manager has been trying for some time to get new equipment on the floor; he says that would solve the problem.

2. The Ishkabibble District has been trying unsuccessfully to get high school principals to use its Edmodo social networking site. They ask you to do an Edmodo workshop for the principals.

3. A company's sales director did a survey of his salespeople and found that they did not know how to use the company's internal website (intranet). He says the need is intranet training, because that's a way they can get up-to-date information on company products.

4. Virtual school students' grades in Spanish classes are consistently lower than those of other classes offered by the same company. The company has hired you to redesign the course's instruction so that students will be better able to learn from it. You decide to gather more information first about the types of problems students are having.

Common Errors and Problems in Writing Instructional Goals

Inexperienced designers also tend to make certain common errors when writing instructional goals. Look at the following problems to avoid in writing goal statements. Each has an example that reflects the problem and a way to correct it.

• **The goal statement is too vague to be measured.** “Awareness” is an internal condition; it is not observable or measurable except by specifying an overt action students must do to demonstrate they have learned.
  
  – **Vague statement:** In the undergraduate government course, 90 percent of students will be aware of the processes used by the Electoral College in a U.S. election.
  
  – **Clear statement:** In the undergraduate government course, 90 percent of students will demonstrate the procedure the Electoral College uses to calculate votes in an election.

• **The goal focuses on the instructor rather than the student.** In this example, “Demonstrate to teachers” places the focus on the instructor's instruction, rather
than how the teachers-as-students show they have learned after instruction. (Also note the addition of a realistic criterion.)

- **Instructor-focused action:** Demonstrate to all teachers why the SpecEd system is the best way to track progress of students with special needs.
- **Student-focused action:** At least 95 percent of teachers will demonstrate correct procedures for using the SpecEd system to track students’ progress.

**The goal focuses on students’ learning activities rather than postinstruction activities.** “Practice using a skill saw” places the focus on students’ learning activities, rather than the application students will make of what they have learned after instruction.

- **Incorrect focus:** All students will practice using the skill saw to create products.
- **Correct focus:** All students will execute correct procedures to create a product with a skill saw.

**Incorrect performance for instructional goals.** One common error is mistaking the performance action for the skill itself. In the following example, taking the test is a physical act, but solving problems is the type of skill involved.

- **Incorrect learning category:** In a Grade 9 algebra class, students will take an exam on algebra problems with one unknown.
- **Correct learning category:** In a Grade 9 algebra class, 90 percent of students will demonstrate how to solve an algebra problem with one unknown.

**Performance criterion missing or level set too low or too high.** If the number of people who should be able to attain the goal is set too high, the instruction may be judged as ineffective, when, in fact, it is doing the job it was intended to do. In some cases, 100 percent achievement may be attainable; make sure the criterion is realistic for the situation.

- **Performance criterion set too high:** In a training class for occupational therapists, 100 percent of students will adopt a strategy for prioritizing work activities to meet client and organizational needs.
- **Performance criterion more realistic:** In a training class for occupational therapists, 90 percent of students will adopt a strategy for prioritizing work activities to meet client and organizational needs.

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**Check Your Understanding 2.6**

**Objective 6 Exercise—Errors and Problems with Instructional Goals.** For each of the goal statements on the right, identify the error(s) or problem(s) on the left that it reflects. (Some statements will have more than one incorrect aspect.) Then rewrite the statements correctly at the bottom.

<table>
<thead>
<tr>
<th>Types of Issues/Problems:</th>
<th>Instructional Goals:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Vague goal statement</td>
<td>1. Learn how to make a well-structured presentation to a group.</td>
</tr>
<tr>
<td>B. Focus on instructor, not student</td>
<td>2. Students will generate the correct balance for a checkbook.</td>
</tr>
<tr>
<td>C. Focus on learning, not postinstruction actions</td>
<td>3. At least 85 percent of workshop participants have a clear understanding of procedures used to handle customer complaints.</td>
</tr>
<tr>
<td>D. Performance error</td>
<td>4. Make all students aware of bases other than decimals for stating numbers.</td>
</tr>
<tr>
<td>E. Performance criterion level missing, too high, or too low</td>
<td>5. Ninety percent of students will satisfactorily complete an exam on using spreadsheet data.</td>
</tr>
</tbody>
</table>
Restatements needed:
1.
2.
3.
4.
5.

Click here for suggested answers

Chapter 2 Summary

• In order to determine the nature of the performance problem and confirm that an instructional design solution is a good “fit” with the problem, designers perform a needs assessment.
• Key characteristics of a needs assessment are that it uses a model (i.e., a performance analysis model and/or an instructional needs analysis model, depending on the situation) and that it requires documentation of the findings.
• Essential characteristics of instructional goals are that they: are written in terms of learned performances, are categorized according to types of learned performances, and are specify performance criteria.
• Procedures for completing needs assessments include: selecting a needs assessment strategy, identifying and collecting data, documenting the need, and writing instructional goals.
• Common sources of errors and problems in assessing needs include: rushing to solutions, issues in identifying needs due to lack of data and/or data interpretation, issues in framing the problem, and political challenges.
• Common sources of errors and problems in writing instructional goals include: the goal statement is too vague to be measured; the goal focuses on the instructor rather than the student; the goal focuses on students’ learning activities rather than postinstruction activities; the performance category for instructional goals is incorrect; the performance criterion is missing; or the passing criterion level is set too low or too high.

References


Chapter 2 Exercises

Exercise 2.2: Questions for Thought and Discussion—These questions may be used for small-group or class discussion or may be subjects for individual or group activities. Take part in these discussions in your in-person class meeting, or use your instructor-provided online discussion area or blog.

a. Zemke (1998) said that one approach to doing a faster needs assessment is sifting through “found data” or “information gathered for a different purpose but that may bear on your performance problem” (p. 42). These sources may include “sales data, customer complaint letters, grievances, and exit interviews” (p. 42). Name a performance problem and identify other sources of “found data” in your field that may be of use in confirming a performance need and identifying instructional goals.

b. Some educators use Bloom’s Taxonomy to categorize types of learning outcomes. Compare Bloom’s system with Gagné’s categories as a way of describing instructional goals. What advantages does each method have for subsequent instructional design work? If you prefer one over the other, explain why.

Exercise 2.3: Design Project Activities and Assessment Criteria—As you develop your instructional product for this course, use the following information to guide your work.

Make sure your needs assessment document meets the following criteria:

1. You specified data sources (e.g., people and documents) that make sense in terms of providing useful information about the performance problem(s).
2. You framed the observed problem in “solution-free” terms as a gap between current and desired performances.
3. You have included a copy of your survey or interview questions and/or a description of how you observed the current performance.
4. Your document presents a convincing case that, based on the information you have gathered, there is a true performance problem that is directly related to addressing the goals of the organization.
5. You have made a convincing case that instruction will be effective in addressing the performance problem. That is, personnel currently cannot do (rather than do not want to do or have forgotten how to do) the desired performance, and instruction is the most efficient, cost-effective way to address the problem.
6. You have made a convincing case that instructional design is the best way to supply the instruction. That is, sufficient time and other resources are available to support design work, the subject area will not change drastically in the near future, and personnel have time to receive training if the instruction is available.

Make sure your instructional goal statement(s) meets the following criteria:

1. They are clearly related to the identified performance problem.
2. They are stated in observable and measurable performances.
3. They are stated in terms of student’s performance after instruction.
4. They are classified correctly in terms of Gagné or Bloom categories of learning.
5. The achievement criterion for the group is stated and is realistic for that group.