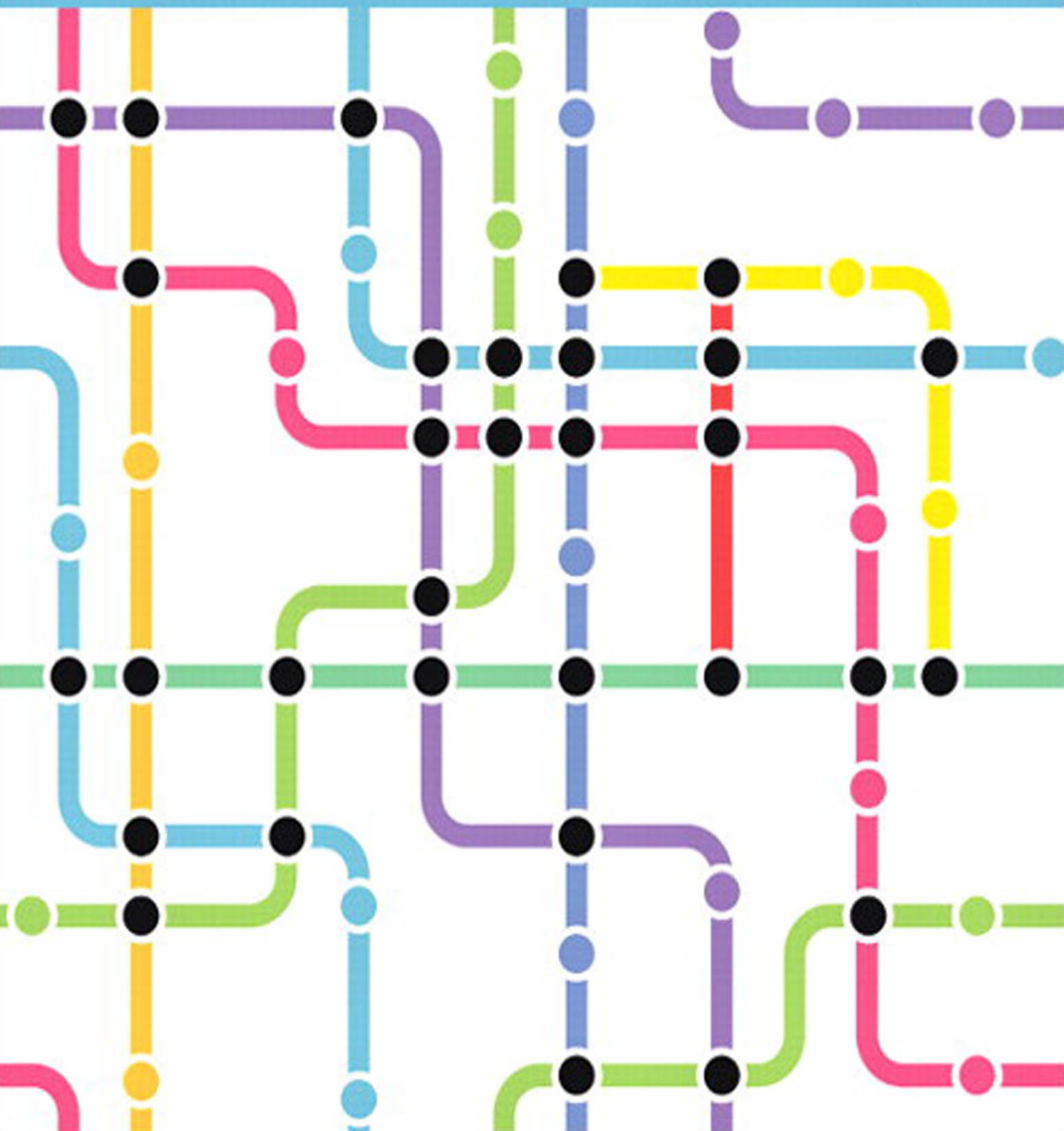
Eighth Edition

THE SYSTEMATIC DESIGN OF INSTRUCTION

Walter Dick • Lou Carey • James O. Carey



The Systematic Design of Instruction

This page intentionally left blank

eighth edition

The Systematic Design of Instruction

Walter Dick
Florida State University, Emeritus

Lou Carey
University of South Florida, Emeritus

James O. Carey
University of South Florida, Emeritus

PEARSON

Boston Columbus Indianapolis New York San Francisco Upper Saddle River
Amsterdam Cape Town Dubai London Madrid Milan Munich Paris Montreal Toronto
Delhi Mexico City São Paolo Sydney Hong Kong Seoul Singapore Taipei Tokyo

Vice President and Editorial Director: Jeff Johnston
Senior Acquisitions Editor: Meredith Fossell
Editorial Assistant: Maria Feliberty
Marketing Manager: Darcy Betts Prybella
Program Manager: Janet Domingo
Project Manager: Cynthia DeRocco
Editorial Production Service: Aptara
Manufacturing Buyer: Linda Sager
Electronic Composition: Aptara
Photo Researcher: Lori Whitley
Cover Designer: Diane Lorenzo

Photo Credit: p. 269: Nyul/Fotolia; p. 271: Gabriel Blaj/Fotolia; pp. 385, 387: Michaeljung/Fotolia, Andy Dean/Fotolia, Thomas Perkins/Fotolia, Lisa F. Young/Fotolia; p. 386: Kmiragaya/Fotolia, McCarthys PhotoWorks/Fotolia, PeJo/Fotolia; p. 387: Dragonimages/Fotolia; COV: Tovovan/Fotolia.

For related titles and support materials, visit our online catalog at www.ablongman.com.

Library of Congress Cataloging-in-Publication Data

Dick, Walter,
The systematic design of instruction / Walter Dick, Florida State University, Emeritus, Lou Carey, University of South Florida, Emeritus, James O. Carey, University of South Florida, Emeritus.—Sixth edition.
pages cm
ISBN-13: 978-0-13-282485-9
ISBN-10: 0-13-282485-X
1. Instructional systems—Design. 2. Lesson planning. I. Carey, Lou. II. Carey, James O. III. Title.
LB1028.38.D53 2015
371.3—dc23

2013041770

the United States of America

10 9 8 7 6 5 4 3 2 1 18 17 16 15 14

PEARSON

ISBN-10: 0-13-282485-X
ISBN-13: 978-0-13-282485-9

BRIEF CONTENTS

CONTENTS

This page intentionally left blank

PREFACE

Not so many years ago, instruction was typically created by professors or trainers who simply developed and delivered lectures based on their research, experience, and expertise. Since the early 1970s, instructional emphasis has shifted dramatically from expert lectures to interactive instruction. This instruction focuses on the main purposes for and anticipated outcomes of the learning, the nature of the environment where acquired knowledge and skills would be used, and the particular characteristics of the learners in relation to the discipline and environment. Effective instruction today requires careful and systematic analysis as well as description of the intertwined elements that affect successful learning, and requires integral evaluation and refinement throughout the creative process.

The elegance of a generic systematic instructional design (ID) process is its inherent ability to remain current by accommodating emerging technologies, theories, discoveries, or procedures. For example, performance analysis and needs assessment reveal new institutional needs and new performance requirements that must now be accommodated in the instruction; analysis and description of the performance context uncover novel constraints and new technologies. Likewise, thoughtful analysis of present learners discloses characteristics not previously observed, and analysis of new instructional delivery options enables more efficient and cost-effective combinations of media and teaching/learning methods. The inquiry and analysis phases inherent in each step of a systematic ID model help ensure the resulting decisions and designs are current, practical, and effective.

The Systematic Design of Instruction, 8th ed., introduces you simply and clearly to the fundamentals of ID, namely the concepts and procedures for analyzing, designing, developing, and formatively evaluating instruction. The text is designed to aid your learning in several ways. The intuitive chapter organization explains each step in the design process through easily understandable sections, including (1) Objectives, (2) Background, (3) Concepts, (4) Examples, (5) Case Study, (6) Summary, (7) Practice, and (8) Feedback. Every chapter leads you through a step of the model, presenting background research carefully illustrated with a wide range of academic and business applications. The contemporary design examples also help you link current theoretical concepts to practical applications. Sample rubrics and exercises provide tools you can use when designing instruction to connect theory to your own real-life applications. Finally, annotated references direct you to resources that help amplify and reinforce each concept in the ID process.

Acquiring the ID ideas and skills presented here will undoubtedly change the way you approach creating instruction. This is not a textbook to be read and memorized, but is meant to be used for you to create effective instruction. You learn a systematic, thoughtful, inquiry-based approach to creation that helps ensure the success of those who use your instruction. For learning ID most effectively, we suggest that you choose a relatively small instructional goal in your own discipline and context, and then as you study each chapter, apply the steps in the model to designing instruction for your personal goal—in other words, this can be a learning-by-doing textbook. This helps ensure that you can take the ID model from this learning experience and make it an integral part of your own ID practices.

In this new edition, we retain the features that seem most important to readers of previous editions as well as adding new perspectives and features that keep the text current within the discipline, including the following:

- Updated references and recommended readings with annotations
- Additional attention to learning and portable digital devices
- Additional attention to the relationship between transfer of learning and the performance context
- Additional attention to the theoretical bases of learning in designing and developing instruction
- Additional tables that help summarize and organize concepts
- Application of ID concepts through a serial case study example for adult learners in a university setting. The case study is carried through the steps of the design model in each chapter of the book
- A complete case study in the Appendices (in addition to the one contained in the text) that details the products of design and development activities for each step in the model for a school curriculum goal on writing composition
- A plan with case study examples for using constructivist learning environments in cognitive ID.

TO THE INSTRUCTOR

The *Instructors' Manual for The Systematic Design of Instruction,* is a WORD document available for download from the publisher's Instructor's Resource Center. As professors teaching an ID course using this textbook, you may copy the *Instructors' Manual for The Systematic Design of Instruction* and paste it into your course management system, e.g., Blackboard. If you do not know how to access the Instructor's Resource Center online to obtain these materials, contact your Pearson Representative for instructions.

The Instructors' Manual for The Systematic Design of Instruction contains important information for those teaching the course, including:

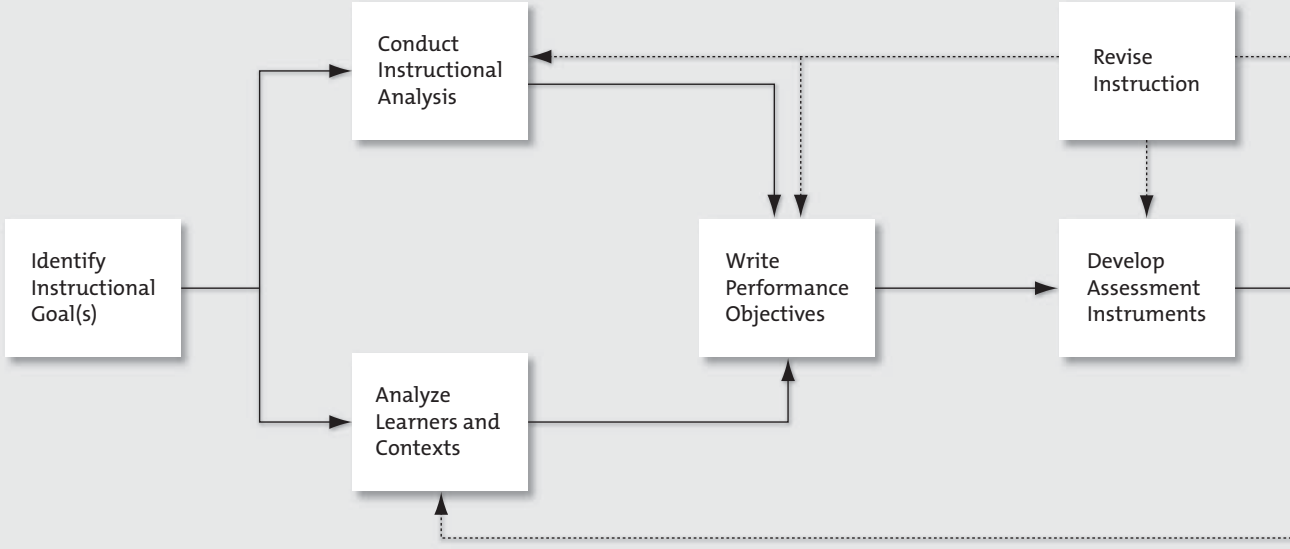
- Course Management Plans for 10-week and 15-week terms
- Suggestions for providing either an information-based or a product-based learning experience
- Course management suggestions for web-based delivery
- Goals and objectives for each step in the model
- Illustrations of preinstructional materials
- Goal analyses for each step in the model
- Rubrics for evaluating ID and development products for each step in the model
- A third case study
- Practice and feedback, including concept quizzes and application quizzes for each chapter of the text

In the spirit of constructive feedback, always an important component of the systematic design process, the authors welcome reactions from readers about ways in which the text may be strengthened to better meet their needs. Please send comments to the authors at the following e-mail addresses:

Walter Dick	wdick@penn.com
Lou Carey	lou.jim.carey@gmail.com
James O. Carey	jcarey@.usf.edu

This page intentionally left blank

The Systematic Design of Instruction

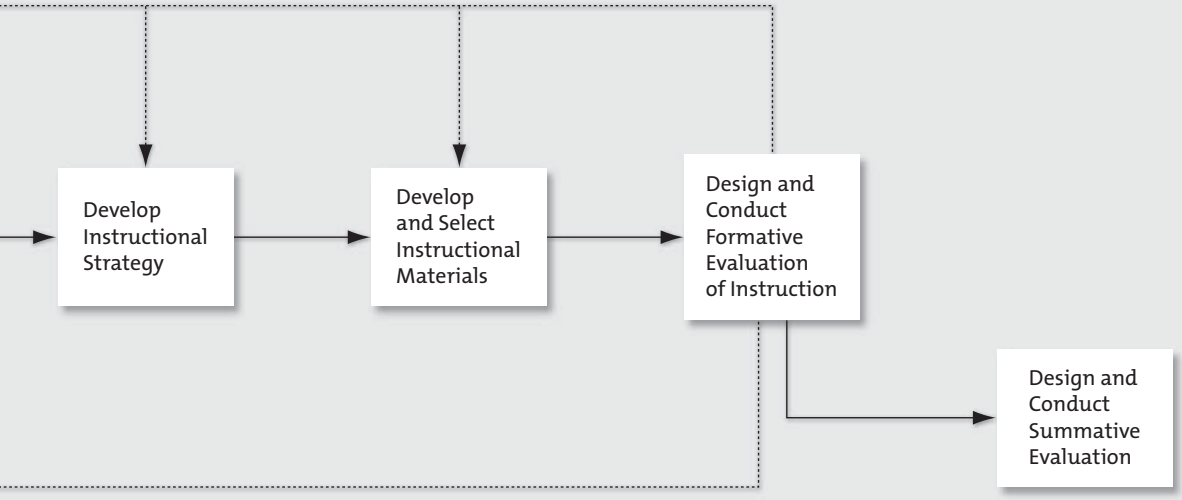


The Dick and Carey Systems Approach Model for Designing Instruction

In a contemporary e-learning or distance-education course, students are brought together with an instructor (perhaps) and are guided through textbook or online content by class activities such as online exercises, question/answer/discussion boards, projects, and interaction with classmates. If student attitudes, achievement, and completion rates are not up to desired levels, such variations as substituting a more interesting textbook, requiring student work groups, or enhancing real-time interaction with the instructor may be tried. If those or other solutions fail to improve outcomes, the instructor or course manager may reorganize the content on the web e-learning portal or, believing that "e-learning isn't for everyone," may simply make no changes at all.

Attempts to improve student achievement by tinkering with this or that component of a course can be frustrating, often leading an instructor or course manager to explain low performance as a student problem—the students lack the necessary background, aren't smart enough, aren't motivated, or don't have the study habits and perseverance to succeed. However, rather than piecemeal fixes or frustrated rationalizations, a more productive approach is to view e-learning—

Introduction to Instructional Design



and indeed, all purposeful teaching and learning—as systematic processes in which every component is crucial to successful learning. The instructor, learners, materials, instructional activities, delivery system, and learning and performance environments interact and work with each other to bring about desired student learning outcomes. Changes in one component can affect other components as well as the eventual learning outcomes; failure to account adequately for conditions within a single component can doom the entire instructional process. Israelite (2004, 2006) characterizes e-learning shortfalls in corporate training as a failure to use *systems thinking*—for example, the investment in high-tech web portals and delivery technologies frequently has not been accompanied by thorough consideration of other instructional components such as the design of effective learning experiences. Israelite's perspective is usually referred to as the *systems point of view,* and advocates typically use systems thinking to analyze performance problems and design instruction.

Let's first consider what is meant by a *system,* and then we provide an overview of the systems approach to instructional design. The term *system* has become very popular as what we do becomes increasingly interrelated with what other people do. A **system** is technically a set of interrelated parts, all of which work together toward a defined goal. The parts of the system depend on each other for input and

output, and the entire system uses feedback to determine if its desired goal has been reached. If it has not, then the system is modified until it reaches the goal. The most easily understood systems are those we create and can control rather than those that occur naturally. For example, you probably have a heating and cooling system in your home in which various components work together to produce a desired temperature. The thermostat is the feedback mechanism through which the system constantly checks the temperature and signals when more heat or cold is needed. At the desired temperature, the system shuts itself off. As long as the thermostat is set and all parts are in working order, the system keeps the temperature in a comfortable range. An automobile's braking system, however, by using a more fallible feedback system—the driver—is a less reliable system. Mechanical failure is seldom the cause of braking-related accidents; rather, it is human failure to recognize and compensate for system components such as slippery road conditions, impaired vision, or distracted attention to a cell phone or a radio while driving in heavy traffic. When human physiological and psychological characteristics are key components of a system, the system becomes less predictable and more difficult to manage for the desired results.

Consider, for example, the management of type 1 (juvenile onset) diabetes. There is a complex and finely balanced set of system components that work together for maintenance of healthy blood sugar levels, particularly (1) diet (what, how much, and when food is eaten), (2) physical exertion, (3) emotional exertion, (4) insulin (when and how much is taken), and (5) each individual's unique metabolic processing of these components. The goal of this system is a stable blood sugar level, and the feedback mechanism is periodic blood sugar readings. When the system is out of balance, readings go outside the acceptable range and one or more system components must be adjusted to bring readings up or down as needed. Controlling this system might seem to be a daunting task in the presence of human individual differences. The systems approach, however, enables professionals to identify interacting components of diabetes care, establish normal human ranges for each component as starting points for care, and then adjust and fine-tune a care regimen as needed to accommodate individual differences. An accepted perspective for professionals in diabetes care is that the system is dynamic rather than static, requiring continuous monitoring as individuals grow, age, and change their lifestyles.

In the same way, the instructional process itself can be viewed as a system whose purpose is to bring about learning. The components of the system are the learners, the instructor, the instructional materials, and the learning environment, all interacting to achieve the goal. For example, in a traditional classroom, the instructor might guide students through sample problems in the textbook or student manual. To determine whether learning is taking place, a quiz is administered at the end of the class. In the instructional system, the quiz is equivalent to the blood sugar readings in diabetes care. If student achievement is not satisfactory, then components must be modified to make the system more effective and bring about the desired learning outcomes.

The systems view of instruction sees the important roles of all the components in the process. They must all interact effectively, just as the parts in a system of diabetes care must interact effectively to bring about desired outcomes. Success depends not on any one component in the system, but rather a determination of the exact contribution of each one to the desired outcome. There must be a clear assessment of the effectiveness of the system in bringing about learning, and a mechanism to make changes if learning fails to occur. As in the example of diabetes care, instructional systems include the human component and are therefore complex and dynamic, requiring constant monitoring and adjustment.

Thus far, our discussion of the instructional process has focused only on the *learning moment*, when teachers, instructional materials, and learners come together

in a classroom with the goal that learning will occur. What about the preparation for the instructional process? How does the instructor decide what to do and when? It is not surprising that someone with a systems view sees the preparation, implementation, evaluation, and revision of instruction as one integrated process. In the broadest systems sense, a variety of sources provide input to the preparation of the instruction. The output is some product or combination of products and procedures that are implemented. The results are used to determine whether the system should be changed, and, if so, how.

The purpose of this book is to describe a systems approach for the design, development, implementation, and evaluation of instruction. This is not a physical system, such as home heating and air conditioning, but a procedural system. We describe a series of steps, all of which receive input from preceding steps and provide output for the next steps. All components work together to either produce effective instruction or, if the system evaluation component signals a failure, determine how instruction can be improved.

Although our model of instructional design is referred to as a *systems approach model,* we must emphasize that there is no single systems approach model for designing instruction. A number of models bear the label *systems approach,* and all share most of the same basic components. The systems approach model presented in this book is less complex than some, but incorporates the major components common to all models, including analysis, design, development, implementation, and evaluation. Collectively, these design models and the processes they represent are referred to as *instructional systems development (ISD). Instructional design (ID)* is used as an umbrella term that includes all phases of the ISD process. These terms all become clear as you begin to use the instructional design process.

Instructional design models are based, in part, on many years of research on the learning process. Each component of the model is based on theory and, in most instances, on research demonstrating the effectiveness of that component. The model brings together in one coherent whole many concepts that you may have already encountered in a variety of educational situations. For example, you undoubtedly have heard of *performance objectives* and may have already written some yourself. Such terms as *criterion-referenced testing* and *instructional strategy* may also be familiar. The model shows how these terms, and the processes associated with them, are interrelated, and how these procedures can be used to produce effective instruction.

The instructional strategy component of our model describes how the designer uses information from analyzing what is to be taught to formulate a plan for connecting learners with the *instruction* being developed with the ID model. Throughout this text, we define the term *instruction* quite broadly as purposeful activity intended to cause, guide, or support learning. As such, instruction encompasses such activities as traditional group lecture/discussion, computer-based drill and practice, moderated small-group online case-study analysis, individualized discovery learning, or group problem solving mediated through avatar characters in a computer-generated virtual world. The range of activities that can serve as instruction is limited only by the imagination of teachers, designers, and students.

Our original approach to this component of the model was heavily influenced by the work of Robert Gagné's *The Conditions of Learning* (1965), which incorporated cognitive information-processing views of learning that assume most human behavior to be very complex and controlled primarily by a person's internal mental processes rather than external stimuli and reinforcements. Instruction is seen as organizing and providing sets of information, examples, experiences, and activities that guide, support, and augment students' internal mental processes. Learning occurs when students incorporate new information and schemes into their memories that enable new capabilities. Gagné further developed cognitive views of learning and instruction in later editions of *The Conditions of Learning* (1970, 1977, 1985). His influence as one of the founders of

the instructional systems development discipline is described in Richey's (2000) book, *The Legacy of Robert M. Gagné*.

Constructivism is a relatively recent branch of cognitive psychology that has influenced the thinking of many instructional designers. Although constructivist thinking varies broadly on many issues, the central point is the view of learning as a unique product "constructed" by each individual learner combining new information and experiences with existing knowledge. Individuals learn by constructing new mental representations of the social, cultural, physical, and intellectual environments in which they live. Because learning in the constructivist view is so entwined with personal experiences, a primary role of the teacher is creating appropriate learning environments—that is, social or technological contexts in which student learning is based on interactions with authentic representations of real practices.

Throughout this text, readers will find predominately a cognitivist view of teaching and learning, but will also see elements of constructivist thinking adapted as appropriate for the varieties of learners, learning outcomes, learning contexts, and performance contexts that are discussed. The Dick and Carey Model incorporates an eclectic set of tools drawn from major theoretical positions since the late 1930s and is an effective design framework for guiding pedagogical practices within all foundational orientations. Although some instructional theorists may question the model as forcing practices counter to their philosophical foundations, the authors counsel an open-minded view and believe that most instructional design practices advocated in the model, when used by expert professionals, are essentially neutral. Master teachers and instructional designers can translate their own views of learning theory into pedagogical practices based on their own decisions about goals, students, and learning environments. Because the model depicts a set of generic ID practices, it has been adapted successfully by teachers, instructional designers, educational technologists, military trainers, and performance technologists in all kinds of settings. For those interested in historical context, Reiser's (2001a, 2001b) articles on the history of instructional design and technology provides a good review of the origins and development of the field.

The model as presented here is based not only on theory and research, but also on a considerable amount of practical experience in its application. In the section that follows, we present the general systems-approach model in much the same way as a practical cookbook recipe—you do this and then you do that. When you begin to use a recipe in your own kitchen, however, it takes on greater meaning. In essence, your use of your own kitchen, your own ingredients, and your own personal touch result in a unique product. You may change the recipe, take shortcuts, substitute ingredients, and perform steps out of sequence. So it is with instructional designers—in the beginning, they use a model such as the one presented in this book as a scaffold to support their analysis, design, development, implementation, and evaluation work. As students and practitioners of instructional design become more experienced and proficient, they replace the scaffold with their own unique solution strategies for the multidimensional problems they encounter in designing instruction. As in any complex endeavor, those who fail to make the jump from dependence to independence never master the discipline and are, at best, good technicians.

As you begin designing instruction, trust the model—it has worked for countless students and professionals since the early 1970s. As you grow in knowledge and experience, trust yourself! The flexibility, insight, and creativity required for original solutions reside in experienced users and professionals—not in models. The Dick and Carey Model is only a representation of practices in the discipline of instructional design. The purpose for the model is to help you learn, understand, analyze, and improve your practice of the discipline, but all models are oversimplified representations. As you grow in understanding, don't confuse the representation with the reality. The graphical arrangement of boxes and arrows, for example, implies a linear process flow, but any experienced instructional designer will attest

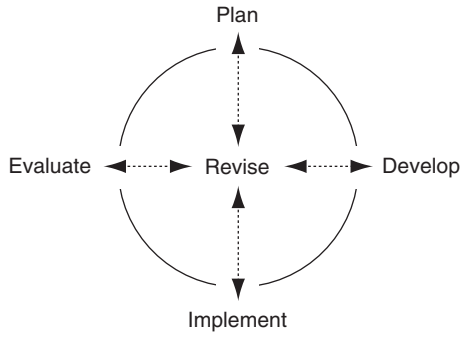


figure 1.1 Continuous Improvement Cycle

that in practice, the process can sometimes look more like the circular, continuous improvement model in Figure 1.1 or the concurrent processes model in Figure 1.2 that is useful when planning, development, implementation, and revision all occur at the same time or in multiple cycles of simultaneous activities. If you are new to the field of instructional design, these figures may not make a lot of sense now, but will come into focus later in the book.

In reading this book, you are beginning to study the discipline of instructional design. The Dick and Carey Model gives us a way to distinguish the practices within the broader discipline, similar to distinguishing the individual trees within a forest; but mastering a discipline requires that we "see the forest for the trees." In his book *The Fifth Discipline: The Art and Practice of the Learning*

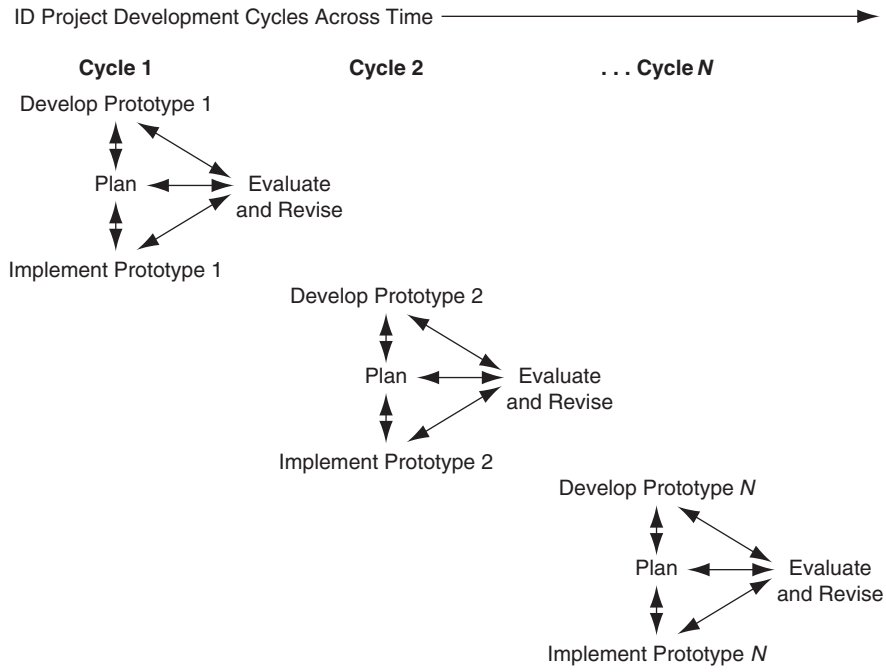


figure 1.2 Concurrent ID Process in Rapid Prototype Development

Organization, Peter Senge (1990) accurately defines and depicts what it means to practice a discipline:

> By "discipline" I mean… a body of theory and technique that must be studied and mastered to be put into practice. A discipline is a developmental path for acquiring certain skills or competencies. As with any discipline, from playing the piano to electrical engineering, some people have an innate "gift," but anyone can develop proficiency through practice. To practice a discipline is to be a lifelong learner. You "never arrive"; you spend your life mastering disciplines.… Practicing a discipline is different from emulating a model. (pp. 10–11)

The model described in detail in succeeding chapters is presented on the first two pages of this chapter. Ten interconnected boxes represent sets of theories, procedures, and techniques used by the instructional designer to design, develop, evaluate, and revise instruction. A broken or dotted line shows feedback from the next-to-last box to the earlier boxes. The sequence of boxes represents steps that are described briefly in the next section and in much greater detail in subsequent chapters.

Components of the Systems Approach Model

Identify Instructional Goal(s)

The first step in the model is to determine what new information and skills you want learners to have mastered when they have completed your instruction, expressed as goals. The instructional goals may be derived from a list of goals, from a performance analysis, from a needs assessment, from practical experience with learning difficulties of students, from the analysis of people who are doing a job, or from some other requirement for new instruction.

Conduct Instructional Analysis

After you have identified the instructional goal, you determine step by step what people are doing when they perform that goal as well as look at subskills needed for complete mastery of the goal. The final step in the instructional analysis process is to determine what skills, knowledge, and attitudes, known as *entry skills,* are needed by learners to be successful in the new instruction. For example, students need to know the concepts of radius and diameter in order to compute the area and the circumference of a circle, so those concepts are entry skills for instruction on computing area and circumference.

Analyze Learners and Contexts

In addition to analyzing the instructional goal, there is a parallel analysis of the learners, the context in which they learn the skills, and the context in which they use them. Learners' current skills, preferences, and attitudes are determined along with the characteristics of the instructional setting and the setting in which the skills will eventually be used. This crucial information shapes a number of the succeeding steps in the model, especially the instructional strategy.

Write Performance Objectives

Based on the instructional analysis and the description of entry skills, you write specific statements of what learners will be able to do when they complete the instruction. These statements, derived from the skills identified in the instructional

analysis, identify the skills to be learned, the conditions under which the skills will be demonstrated, and the criteria for successful performance.

Develop Assessment Instruments

Based on the objectives you have written, you develop assessments that are parallel to and that measure the learners' ability to perform what you describe in the objectives. Major emphasis is placed on relating the kind of skills described in the objectives to the assessment requirements. The range of possible assessments for judging learners' achievement of critical skills across time includes objective tests, live performances, measures of attitude formation, and portfolios that are collections of objective and alternative assessments.

Develop Instructional Strategy

Based on information from the five preceding steps, a designer identifies a theoretically based strategy to use in the instruction to achieve the goal that emphasizes components to foster student learning, including

- preinstructional activities, such as stimulating motivation and focusing attention
- presentation of new content with examples and demonstrations
- active learner participation and practice with feedback on how they are doing
- follow-through activities that assess students' learning and relate the newly learned skills to real-world applications

The strategy is based on current theories of learning and results of learning research, the characteristics of the media used to engage learners, content to be taught, and the characteristics of the learners who participate in the instruction. These features are used to plan necessary logistics and management, develop or select materials, and plan instructional activities.

Develop and Select Instructional Materials

In this step, the instructional strategy is used to produce the instruction, and typically includes guidance for learners, instructional materials, and assessments. (In using the term *instructional materials,* we include all forms of instruction such as instructor's guides, student reading lists, PowerPoint presentations, case studies, videos, podcasts, computer-based multimedia formats, and web pages for distance learning.) The decision to develop original materials depends on the types of learning outcomes, the availability of existing relevant materials, and developmental resources available to you. Criteria for selecting from among existing materials are also provided.

Design and Conduct Formative Evaluation of Instruction

Following completion of a draft of the instruction, a series of evaluations is conducted to collect data used to identify problems with the instruction or opportunities to make the instruction better, called *formative* because its purpose is to help create and improve instructional processes and products. The three types of formative evaluation are referred to as *one-to-one evaluation, small-group evaluation,* and *field trial evaluation*, each of which provides the designer with a different set of information that can be used to improve instruction. Similar techniques can be applied to the formative evaluation of existing materials or classroom instruction.

Revise Instruction

The final step in the design and development process (and the first step in a repeat cycle) is revising the instruction. Data from the formative evaluation are summarized

and interpreted to identify difficulties experienced by learners in achieving the objectives and to relate these difficulties to specific deficiencies in the instruction. The dotted line in the figure at the beginning of this chapter (labeled "Revise Instruction") indicates that the data from a formative evaluation are not simply used to revise the instruction itself, but are used to reexamine the validity of the instructional analysis and the assumptions about the entry skills and characteristics of learners. It may be necessary to reexamine statements of performance objectives and test items in light of formative data. The instructional strategy is reviewed, and finally all of these considerations are incorporated into revisions of the instruction to make it a more effective learning experience. In actual practice, a designer does not wait to begin revising until all analysis, design, development, and evaluation work is completed; rather, the designer is constantly making revisions in previous steps based on what has been learned in subsequent steps. Revision is not a discrete event that occurs at the end of the ID process, but an ongoing process of using information to reassess assumptions and decisions.

Design and Conduct Summative Evaluation

Although summative evaluation is the culminating evaluation of the effectiveness of instruction, it generally is not a part of the design process. It is an evaluation of the absolute or relative value of the instruction, and occurs only after the instruction has been formatively evaluated and sufficiently revised to meet the standards of the designer. Because the summative evaluation is usually not conducted by the designer of the instruction but instead by an independent evaluator, this component is not considered an integral part of the instructional design process per se.

Procedures used for summative evaluation are receiving more attention today than in previous years because of increased interest in the transfer of knowledge and skills from training settings to the workplace. This type of evaluation answers questions related to whether the instruction provided solved the problems it was designed to solve. There is also increased interest in the effectiveness of e-learning across organizations, states, and countries. For example, will e-learning developed for learners in Utah, which is very transportable electronically, be effective for students in the Caribbean or China? What would experts in learning conclude about the instructional strategies within very attractive materials that were developed "a world away"? Terms such as *learner verification, materials effectiveness,* and *assurances of materials effectiveness* are resurfacing now that materials transportability is much more economical and effortless.

The nine basic steps represent the procedures employed when using the systems approach to design instruction. This set of procedures is referred to as a *systems approach* because it is made up of interacting components that together produce instruction to satisfy needs expressed in a goal. Data are collected about the system's effectiveness so that the final product can be improved until it reaches the desired quality level.

Using the Systems Approach Model

Now that you have read about this model, you should consider several very important questions about its use, discussed in the sections that follow.

Why Use the Systems Approach?

Among the reasons that systematic approaches to instructional design are effective is the required focus, at the outset, on what learners are to know or be able to do when the instruction is concluded. Without this precise statement, subsequent

planning and implementation steps can become unclear and ineffective. This focus on outcomes is pertinent for all involved in public schools because of the contemporary political climate in education. The most recent standards/accountability movement began with a number of states passing laws establishing tests and performance standards for judging student, school, and school district performance and was cemented when Congress passed the No Child Left Behind Act of 2001, followed by the National Governors Association Common Core Standards initiative in 2009. These programs mandate state-level development and implementation of assessments of basic skills at selected grade levels. A systems approach to instruction is a powerful tool for planning successful standards-based education because of the tight alignment among learning outcomes, student characteristics, instructional activities, and assessments.

A second reason for using the systems approach is the interlocking connection between each component, especially the relationship between instructional strategy and desired learning outcomes. Instruction specifically targeted on the skills and knowledge to be learned helps supply the appropriate conditions for these learning outcomes. Stated another way, the instructional range of activities cannot be loosely related or unrelated to what is to be learned.

The third and perhaps most important reason for using the systems approach is that it is an empirical and replicable process. Instruction can be designed for a single delivery or for use on multiple occasions with multiple learners. Because it can be reused with similar and scalable student audiences, it is worth the time and effort to evaluate and revise it. In the process of systematically designing instruction, data are collected to determine what part of the instruction is not working, and it is revised until it does work.

The systems approach is an outcomes-based approach to instruction because it begins with a clear understanding of the new knowledge and skills that students will learn. Although widely adopted among educators at all levels, the systems approach finds even more numerous applications in business and industry, government, nonprofits, nongovernmental organizations (NGOs), and the military, where there is a premium on both efficiency of instruction and quality of student performance, with high payoffs for both.

For Which Instructional Types and Student Groupings Is the Systems Approach Appropriate?

The systems approach to designing instruction includes the planning, development, implementation, and evaluation of instruction. Part of this process is choosing the type of instruction. In some instances, it is most appropriate to have an instructor deliver the instruction; in other situations, a variety of media may be used. In every instance, the systems approach is an invaluable tool for identifying what is to be taught, determining how to teach it, and evaluating the instruction to find out whether it is effective.

The procedure described in this text for developing an instructional strategy is a generic one. Although systematically designed instruction is not necessarily individualized, a primary application of the systems approach to instructional design is for the individual learner. Useful for developing simple, tutorial print instruction for individual students, the systems approach is equally applicable to problem-solving assignments for small groups of students or complex digital multimedia for distance delivery to a mass audience over the web. The procedure easily fits the requirements of any preferred medium of instruction, noting that most research suggests that it is the analysis process and the instructional strategies, rather than the delivery mode, that determine instructional success. The systems approach is a generic planning process that ensures that materials developed for any type of instruction or student grouping are responsive to the needs of learners