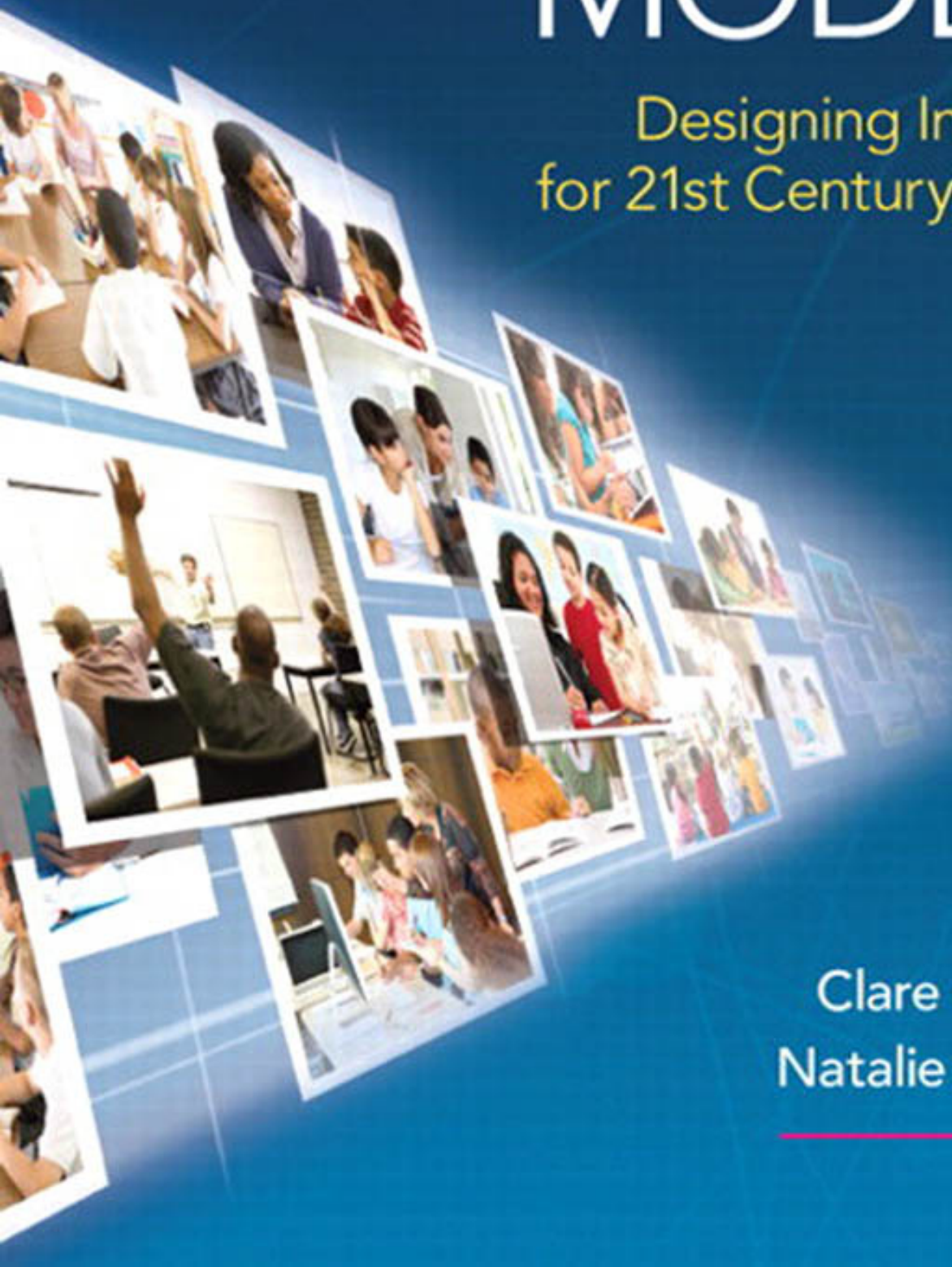
TEACHING MODELS

Designing Instruction for 21st Century Learners



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To our teachers—who shared the art and soul of teaching with us.

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Clare R. Kilbane, Ph.D., has worked with learners at all educational levels—from grad school to grade school—for more than 20 years. A former elementary educator and technology coordinator, Clare has a bachelor's degree from the University of Dayton, a master's degree in instructional design from Ohio State University, and a Ph.D. in educational evaluation from the Curry School at the University of Virginia. She has been on the faculty at the University of Massachusetts Amherst and Capital University, and she is currently a tenured associate professor of educational technology at Otterbein University. Clare has an active consulting practice with K–12 schools, is a frequent speaker at professional conferences, and has participated in numerous statewide grants and research projects involving technology integration and digital portfolios. She is the coauthor of the *Digital Teaching Portfolio Handbook* and *Digital Teaching Portfolio Workbook* with Natalie Milman and is currently coauthoring a text with Carol Ann Tomlinson for the Association for Supervision and Curriculum Development. She has also authored numerous articles, reviews, online courses, and multimedia materials. Clare lives with her husband, her daughter, and two Glen of Imaal terriers in Columbus, Ohio.

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Foreword

To say that the beginning of my teaching career was inauspicious is to compliment it. I would like to think that some first-year teacher somewhere began with less awareness of the art and science of teaching than I did, but that may be a vain hope.

I began teaching high school students in a very rural K–12 school at the end of the first marking period as the result of a newspaper advertisement. I asked that I be allowed to observe the class for a day before I began teaching because I had no idea what content I would be expected to cover. In that day of observation, which was arguably at least a month long, I discovered that the students who were about to become mine not only did not listen to instructions but also did not remain in their seats as class progressed—and, in fact, could and did crawl out of the classroom's first-floor window to enjoy one another's company in the autumn air of the schoolyard. During that very long day, my thoughts never turned to the nature of the disciplines I would be teaching. Rather, I conducted an extended debate with myself about whether I really needed a job badly enough to return the next day. Reality won and I did return, armed with virtually no sense of what it meant to teach—let alone to teach well.

My first lesson plan for the two World History classes I taught consisted of a crossword puzzle. My instructional goal, had I known I should have one, was to see if I could use the puzzle to keep the students' attention—maybe to help them begin to work with me and to work with one another. In fact, I did keep their attention that day. They were completely absorbed with my lesson—because they had never seen a crossword puzzle and had no sense at all of how to answer #1 across which read, "Our country, abbr." There were two problems. They did not know the name of the country in which they lived, and they did not know the term *abbreviation* (which, of course, was abbreviated in the list of clues). The two class periods were incredibly diagnostic of the gap that existed between the prior experience of my students and the aspirations of the textbook.

My most promising "instructional innovation" that year came fairly early. As I tried to discover how I could help the tenth-graders connect with the content of World History, I discovered that religion was an important part of life for many of them. They were all Protestants, but they did not know that and were reluctant to take my word for it. So it seemed reasonable to begin our study with the Reformation. While it was not exactly at the front of the textbook, it felt important to help the kids see themselves and their world in the context of history. In talking with them about Protestantism, its roots, and their connection with those roots, I discovered that the students did not know any Catholics and had never heard of Judaism. So I planned a trip to a university town about 90 minutes away from the school and arranged for visits with a priest and a rabbi in their places of worship so that the two men could talk with the students a bit about the history of their faiths.

The trip was oddly successful. The students were thoughtful and respectful with the young priest and young rabbi. The trip itself spoke to the students of my interest in them, and they trusted me more for it. The small town we visited was vast to many of the students who had never traveled. One student said to me with some awe as we got on the bus to return to school, "You know what? I been looking as hard as I could all day long and I ain't seen the same person twice yet today." And the trip was helpful to me because it gave me the courage to reach outside the four walls of our classroom to a larger world as I taught.

The successes were modest, however. Students' learning suffered from their teacher's lack of clarity, precision, and finesse in teaching. Responding to a "throwaway" question on the unit test, one student told me that the most important thing on the trip for him was when we went to the "send-a-god" to see the "rabbit." There was some widespread confusion about possible connections between the word *Protestantism* and the word *prostitution*. And I think it is safe to say that

the students never accepted that their brands of religion had anything to do with Martin Luther (whom they often referred to as Martin Luther King).

Over the decades that followed, I learned about designing instruction—slowly, awkwardly, and without the benefit of a framework or vocabulary to guide my thinking. I did some good things that would qualify as "sound pedagogy" and some embarrassing things that most certainly would not. I learned from both. But I wasted time and energy.

This book, *Teaching Models: Designing Instruction for 21st Century Learners*, creates in me a sense of longing to begin my work as a teacher again—armed with its insights. How much sharper might my thinking have been if I had known the vocabulary for four types of knowledge? How much more purposeful might my instructional choices have been if I had understood how and when to use 10 major instructional models? How many more students might I have reached if someone had illustrated for me how to attend to students' learning differences as I planned lessons? And how much more motivating might the learning opportunities I created for my students have been had there also been opportunity and guidance for using contemporary technologies to engage my students' thinking, and my own? I would sign up in an instant to go back to that first year and begin again if I could take that sort of knowledge with me.

The times we teach in are complex and challenging on every level, but we know so much more than we did just three decades ago about how the brain works, about how students learn, and about what teachers can do to maximize student potential. We understand the power of traditional models of teaching but cannot help recognizing that the skillful integration of 21st century technologies can enable more equitable learning opportunities for all. I am energized by the ways *Teaching Models* weaves together so many of the proven approaches and innovative strategies our profession has to offer. And I am excited for prospective and current educators who are willing to draw on this resource to become "educational designers" who can empower contemporary students to engage today and continue learning throughout their lives.

Carol Ann Tomlinson
William Clay Parrish, Jr. Professor & Chair
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PREFACE

Regardless of what you teach or where you teach, your success as an educator in the 21st century depends on your ability to design effective instruction for those you teach. Such instruction successfully addresses the individual and shared learning needs of a diverse population of students as they work to master content area learning and the skills required for life in a dynamic, fast-paced, technology-driven, global society. Contemporary educators find themselves surrounded by an unprecedented variety and quantity of powerful resources for teaching. However, these resources—whether they be materials, models, strategies, or technologies—are effective only to the extent that teachers know when and how to coordinate their use to prepare students for the increasing education and workforce demands they will face throughout their lives.

Designing effective educational experiences requires teachers to function as educational designers. An educational designer is a teacher who approaches instructional planning with purpose, uses knowledge of specialized systematic processes to identify and frame instructional challenges related to learners and content, and competently addresses these challenges through the skillful application of a broad repertoire of instructional models, strategies, and technologies. Educational designers approach the work of teaching with a new mind-set, a broadened skill set, and a high-quality tool set—all of which assist them in developing instruction that responds to their learners' needs. The new mind-set enables teachers to approach their work as empowered problem solvers who are aware of their ability to direct important dimensions of practice. The expanded skill set allows them mastery over systematic approaches to instructional planning and assessment processes. The high-quality tool set consists of a collection of models, strategies, and technologies for teaching that can make learning more efficient, effective, and engaging.

Text Organization

Part I of this text explains why functioning as an educational designer will lead to more successful teaching, and it proposes that this orientation supports optimal use of the models of teaching that are the focus of Part II. Chapter 1 frames the challenges of 21st century teaching, illustrates the influence of major trends on the profession, and highlights unique characteristics of 21st century learners. Chapter 2 introduces teachers to the field of instructional design and demonstrates how systematic processes used by instructional designers can support more effective teaching. Chapter 3 presents the different types of tools available for 21st century teaching and promotes the development of specialized knowledge for their implementation. Chapter 4 describes the three major types of assessment and their role in the assessment cycle. Knowledge of content in these chapters is critical for educational designers when deciding how to optimally use the instructional models in this book. Part I provides a foundational understanding that enables the reader to appreciate the enduring value of the instructional models in the context of 21st century teaching and to recognize how they can be made even more powerful when used in concert with the assessment cycle, differentiated instruction practices, and technology tools.

Part II of this text presents 10 powerful, proven models of teaching: Direct Instruction, Concept Attainment, Concept Development, Inductive, Vocabulary Acquisition, Inquiry, Problem-Based Learning, Cooperative Learning, Integrative, and Socratic Seminar. The presentation of these models demonstrates that they can be transformed for new relevance in the digital era and used to address the challenges of 21st century teaching through (1) the increased use of technology during planning, implementation, and assessment; (2) the integration of differentiated instruction principles and practices; and (3) their purposeful application by educational designers who apply systematic thinking and processes to design instruction for their students.

The 10 models selected for inclusion in this text support the development of skills and knowledge required for successful life, work, and learning in the 21st century, including the 4Cs—collaboration, communication, critical thinking, and creative thinking. They also address academic content across grade levels, are suitable for use in each content area, and can be used as specialized tools for addressing specific types of knowledge (i.e., factual, procedural, conceptual, and metacognitive).

In each chapter, we provide the history of the instructional model, relevant research, its steps, and practical information supporting its best use. Rich illustrations of the model in educational settings and detailed suggestions for differentiating the content of instruction, instructional processes, and evaluation of student learning are also integrated throughout. Each chapter utilizes a common structure for communicating chapter content—using recurring, descriptive section headings. This organization makes it easy for readers to locate information that corresponds with their particular interest in the model and their readiness for learning about it. Although each chapter is presented in a linear format, readers should feel free to read the various chapter sections in whatever order they choose and consider the various section headings as differentiated "entry points." The integration of technology as a tool to make the planning, implementation, and assessment that supports student learning more efficient, effective, and engaging is a major emphasis of each chapter. The integration of technology tools is intended to be treated as a standard practice—and not as an "add-on." Embedded in these chapters are field-tested lesson plans illustrating how differentiated practices and technology tools support all dimensions of the learning process.

Text Features

The following features have been included to promote the comprehension of those reading the text and to promote the application of content in the text to contemporary educational practice.

SCENARIOS These stories or "vignettes" illustrate each chapter's main ideas in practical classroom settings with diverse learners. Multiple scenarios are included in each chapter and referenced within chapter sections to connect the content to the "real world" of teaching in 21st century classrooms. These scenarios link chapter content to the reader's personal experiences while also raising questions and inspiring discussion. The opening scenario for each chapter connects to an in-depth lesson plan that illustrates the chapter's specific instructional model. Later, three scenarios present examples of how each model might be applied in practice at the elementary, middle school, and high school levels.

TECHNOLOGY TOOLS TABLE In each chapter from Chapter 5 through Chapter 14, a technology tools table provides readers an easy-to-navigate summary of specific tools that make implementation of the chapter's instructional model more efficient, effective, and engaging. Tools ranging from hardware like interactive whiteboards and student response systems to software and Web-based applications are included. The table highlights ideas that are embedded throughout the text and offers readers a concise guide promoting transfer to practice.

OPENING MATRIX This matrix appears at the beginning of each chapter from Chapter 5 through Chapter 14 to offer a short annotation of important ideas that are introduced. Readers can use the matrix to scan quickly through chapters and (1) view the matrix as an advanced organizer, (2) determine which models might be useful to them, (3) find models that can support specific instructional goals they have, (4) find models that might be made possible with technologies at their fingertips, or (5) jog their memory of what they have read.

LESSON PLAN/LESSON PLAN STEPS FIGURE These features, included in Chapters 5 through 14, provide in-depth illustrations of how each chapter's model can be practically applied to address specific curriculum objectives in a classroom context. Plans are intentionally varied by content area, standards, grade level, grouping, technology, and materials used. Each lesson plan illustrates how ideas about instructional models, differentiated instruction, and technology tools

can be integrated within a practical setting. The lesson plan steps provide a concise summary of the major steps in the model lesson plan for quick reference. Content from both is referenced within the chapter text to provide examples that reinforce reader comprehension. Lesson plans can be used "as is" or modified by the reader in practice. Lesson plans link to current standards to demonstrate the match between models and standards.

DIFFERENTIATED INSTRUCTION AND DIFFERENTIATED INSTRUCTION EXAMPLES In this text, differentiated instruction is viewed as a standard practice that 21st century teachers should implement. It is an essential component of instruction and not simply an add-on. To communicate this view, this text integrates examples of differentiated instruction in practice throughout chapter content, lesson plans, and examples. It also features differentiated instruction in a special section of its own that provides concrete suggestions for how the content, process, and/or products associated with instruction at the elementary, middle, and high school levels might be adapted to make learning more productive for all students. Examples provide illustrations of how the steps of each instructional model inherently support differentiation and how additional modifications might make the model even more suited to diverse learners in elementary, middle, and high school settings.

CHAPTER SUMMARY Each chapter includes a summary that reviews major content in the chapter and serves as support for readers' comprehension and retention of main points.

APPLICATION ACTIVITIES These activities cultivate professional skills required for successful teaching and assessment with formal measures. In these activities, readers are challenged to consider how the processes of planning, teaching, and assessing in conjunction with the implementation of the instructional models can be optimized.

TECHNOLOGY INTEGRATION ACTIVITIES These activities help readers develop technological pedagogical content knowledge (TPACK) and the ability to integrate technology tools successfully.

JOURNAL ENTRY These prompts for reflection on the learning associated with each chapter promote thoughtful consideration of chapter contents and application to practice.

STEPS OF MODEL TABLE This table provides a short description of each step in the model introduced, including an outline of student and teacher roles. It acts as a reminder of key points and enables readers to scan chapters for relevance or refresh their memory of the chapter content.

CHAPTER OBJECTIVES/CHAPTER REVIEW QUESTIONS Each chapter begins with a list of targeted objectives that offer readers an advanced organizer of chapter content. Chapter review questions facilitate comprehension and retention.

Appendixes

The appendixes provide content relevant to all chapters in the text, conveniently located in one place.

APPENDIX A: THE ADDIE MODEL IN PRACTICE An illustration of how several educational innovations—the ADDIE model, the revised Bloom's taxonomy, and Understanding by Design—can be integrated to create high-quality instruction. The compatibility of these innovations is demonstrated in a practical example from classroom practice.

APPENDIX B: CONCEPT TEACHING ADVANCED MATERIALS Special support is provided for educators teaching concepts. This appendix provides a glossary of terms, graphics that illustrate key concepts, and black-line masters that will make teaching more productive.

APPENDIX C: WORKSHEETS Worksheets referenced throughout the text are gathered in one place for convenient access. The worksheets promote transfer of the book's contents to practice.

APPENDIX D: INSTRUCTIONAL MODELS MATRIX This graphic resource provides a quick visual for each of the instructional models. At a glance, teachers may access essential information about each model, including its steps, history, and support for the development of 21st century skills. The matrix makes it easy for readers to gain an overview of each model, compare them, and decide which are most relevant to their instructional goals.

APPENDIX E: LESSON PLAN FRAMEWORK Completion of this in-depth lesson plan framework supports a systematic approach to instructional decision making. The framework reflects major ideas in the text and is intended to cultivate more intentional practice and successful teaching.

Support Materials for Instructors

The following resources are available for instructors to download on www.pearsonhighered.com/educators. Instructors enter the author or title of this book, select this particular edition of the book, and then click on the **Resources** tab to log in and download textbook supplements.

INSTRUCTOR'S RESOURCE MANUAL AND TEST BANK (0133355128/9780133355123) The Instructor's Resource Manual and Test Bank include suggestions for learning activities, discussion topics, group activities, and a robust collection of test items. Some items (lower-level questions) simply ask students to identify or explain concepts and principles they have learned. But many others (higher-level questions) ask students to apply those same concepts and principles to specific classroom situations—that is, to actual student behaviors and teaching strategies.

TESTGEN (0133355128/9780133355123) TestGen is a powerful test generator that instructors install on a computer and use in conjunction with the TestGen test bank file for the text. Assessments, including equations, graphs, and scientific notation, may be created for both print and testing online.

TestGen is available exclusively from Pearson Education publishers. Instructors install TestGen on a personal computer (Windows or Macintosh) and create tests for classroom testing and for other specialized delivery options, such as over a local area network or on the Web. A test bank, which is also called a test item file (TIF), typically contains a large set of test items, organized by chapter and ready for use in creating a test, based on the associated textbook material.

The tests can be downloaded in the following formats:

- TestGen Testbank file—PC
- TestGen Testbank file—MAC
- TestGen Testbank—Blackboard 9 TIF
- TestGen Testbank—Blackboard CE/Vista (WebCT) TIF
- Angel Test Bank (zip)
- D2L Test Bank (zip)
- Moodle Test Bank
- Sakai Test Bank (zip)

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Teaching Models

DESIGNING INSTRUCTION FOR 21ST CENTURY LEARNERS

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chapter

1

one

Teacher as Educational Designer

Clare Kilbane

It had been nearly three weeks since Franklin Elementary School had reopened after extensive renovations. In spite of the school board's original plan to demolish the school and construct a modern building in its place, public desire, funding, and a talented design team managed to save the cherished community landmark. Reconfiguring the historic building to ensure its function and relevance for another 100 years was not easy, but everyone knew that combining the best of old and new was the right thing to do.

Betty Roberts, a second-grade teacher, grinned while observing the organized chaos during her supervision of the morning rush. As she watched children spill out of the school buses, Betty reflected that students had changed during her tenure at Franklin. Although they still had the same boundless energy, joy, and wonder that had drawn her to work with

them 22 years earlier, her students' interests, backgrounds, and learning needs had become more diverse. Thanks to the school's design team, important information about Franklin's students had been systematically identified through a needs assessment and was addressed in the building redesign. The faculty was amazed by the useful information that was discovered about its diverse student body when the right questions were asked. The end result—a well-functioning, renovated school—was proof that communicating with all stakeholders, including the students, was worth the effort.

Betty served on the building redesign committee alongside her principal, Dr. Angela Fayne. Betty knew that her leader was profoundly influenced by the design team's approach, so she was not surprised when Principal Fayne made a special announcement at the school's opening faculty meeting. "What our design team helped us learn about our students must not only *inform* the redesign of the building at Franklin Elementary, it should *transform* the instructional practices that go on within it," she said. "We serve all our students, and it is our responsibility to provide each one with the opportunity to fulfill his or her life's promise." She then proposed, "This year, we need to approach our work as 'educational designers.' Like the building design team, I want you to apply systematic thinking and processes when developing units and lessons. We need to become more skilled in using data from the assessment cycle and let it inform instructional decisions that coordinate knowledge and resources to provide equitable opportunities for all of our students." Workshops related to the topic began immediately and continued throughout the year.

Franklin's new learning environment offered more abundant resources for teaching than ever before. Upgraded electric and network infrastructures allowed for a video studio, new computers, mobile learning tools (e.g., tablets), and other high-tech equipment. Bigger classrooms with flexible seating, updated curriculum materials, and ample storage space for equipment enabled innovative teaching. In the renovated Franklin Elementary, access to adequate resources was no longer a barrier to effective teaching. Instead, the challenge became figuring out which resources to use, when to use them, and how to use them most effectively. Betty felt a deep professional responsibility to her students and community to give this challenge her best effort. But desire, hard work, and experience were not enough; she also needed to figure out how to integrate the new tools effectively and how to make optimal use of Franklin's resources to support her learners. Perhaps this is where her principal's new ideas about systematic processes and being an educational designer could prove helpful.

Betty had already used some systematic thinking when preparing for her new classroom space. Because the building renovation required teachers to move everything out of the building, she spent the summer organizing and "weeding" her instructional materials. As she carefully inventoried the boxes of books, manipulatives, software, and other resources

she had used in the past, Betty was forced to decide what to keep, what to discard, and what to reinvent before returning to her classroom. As she examined the artifacts from her teaching, she considered which instructional practices had served her well and which might be outdated. She also identified areas where new techniques might be required to ensure her continued success and relevance with her new and future students.

Using the same deliberate and evidence-based practices employed by the building design team, Betty acquired important insights. She realized she would need to gain a better command of the assessment cycle and develop methods for integrating differentiation strategies and technology tools. The reflective process enabled Betty to develop both an improved understanding of her instructional resources and a more informed view of herself as a teacher.

As Betty followed her students into the school building, she laughed to herself when she realized that Franklin Elementary was not the only "historic landmark" that had experienced transformation during the renovation process. Moving into a new school building had not been easy, and Betty knew that it would prove even more challenging to move into a new educational era. Still, Betty knew, both moves would be entirely worthwhile. ■

CHAPTER OBJECTIVES

After reading this chapter, you will be able to:

- Describe the major trends influencing education in the 21st century.
- Explain some important characteristics of 21st century learners.
- Identify how the models of teaching can be transformed for increased relevance in the 21st century.
- Define what is meant by the idea of "teacher as educational designer."
- Articulate how being an educational designer can enable teachers to optimize their use of the models of teaching.

Introduction

Regardless of what you teach or where you teach, your success as an educator in the 21st century depends on your ability to design effective instruction for those you teach. Such instruction addresses the individual and shared learning needs of a diverse population of students as they work to master content area learning and the skills required for life in our fast-paced, technology-driven, global society. Contemporary educators find themselves surrounded by an unprecedented variety of powerful teaching resources. However, these resources—whether materials, models, strategies, or technologies—are effective only if teachers know when and how to use them.

In the opening scenario, we meet Betty, a second-grade teacher at Franklin Elementary School. Betty cares deeply about her students and wants to design instruction that is responsive to their needs. She has access to powerful resources and possesses extensive knowledge from experience. Yet in order to successfully prepare her diverse learners for the 21st century, she must reinvent her teaching practice. She must become, as Principal Fayne suggests, an "educational designer."

An **educational designer** is a teacher who approaches instruction with intention and clear goals. He or she applies specialized knowledge and skills to identify and frame instructional challenges and addresses them using a broad repertoire of instructional models, strategies, and technologies. Being an educational designer requires a new *mind-set*, a broad *skill set*, and a high-quality *tool set*. The new mind-set enables a teacher to approach his or her practice with increased control over important dimensions of the instructional process. The expanded skill set includes systematic approaches to instructional planning and assessment processes. The high-quality tool set consists of a collection of powerful models, strategies, and technologies for teaching.

With this design orientation, teachers like Betty can effectively support diverse learners as they work to meet the uniformly high standards for their learning. They can also make optimal use of the abundant resources for teaching in the digital era—especially the models of teaching that are the focus of this text. This design orientation gives teachers the flexible approach required for balancing the individual and shared needs of their students, adapting instruction, and coordinating the many resources available for teaching in contemporary classrooms.

Important trends shaping life and work in the 21st century and their influence on the field of education support the proposition that successful teachers will need to function as educational designers. We begin this chapter by highlighting these trends and explore their influence on the education of contemporary learners. Later, we explain why the traditional models of teaching presented in this text are more relevant than ever and describe how educational designers can maximize the potential of these models in the 21st century.

21st Century Trends and Their Impact on Education

What goes on inside of our nation's schools is increasingly influenced by what goes on outside of them. Five major trends—digital technologies, access to information, globalization, equity, and accountability—are changing the world in profound ways. As they do, they also affect preK-12 education and 21st century teaching through the ideas, movements, and reforms they inspire. An awareness of these trends and the ways they influence the field of education will help teachers better understand what is required to prepare 21st century learners for the future.

Digital Technologies

The development of powerful digital technologies and the pace of change associated with them are making an unprecedented impact on society around the globe. Digital technologies are distinct and different than the mechanical ones of the past. They are powered by electrical energy, perform functions that are not necessarily confined to a finite physical

space, and are often connected to some type of data network. Their creation and integration into daily living has resulted in the "digital revolution."

Like the agricultural and industrial revolutions of the past, the digital revolution is influencing employment, education, citizenship, and most other aspects of daily living. The progress enabled by digital technologies and the processes these devices facilitate bring with it the same promise and peril of previous revolutions. Yet the digital revolution has two special features that characterize it. First, the product yielded from the use of digital technologies is quite often new information and ideas. As this "product" is processed, long-held assumptions about the most fundamental aspects of human existence are challenged. This means that the use of digital technologies not only changes the lives of individuals and communities but also the individual's understanding of the very concept of "life" and "community." Second, the pace of change associated with digital technology—including its development, functioning, and integration into daily living—is faster and more sustained than that associated with the mechanical technology of the past. This fact presents a challenge to human beings who are not always able to keep up with the pace of change dictated by the tools they create. These important characteristics associated with the development of digital technology are indeed revolutionary and suggest important implications for those who wish to prepare learners for the digital era.

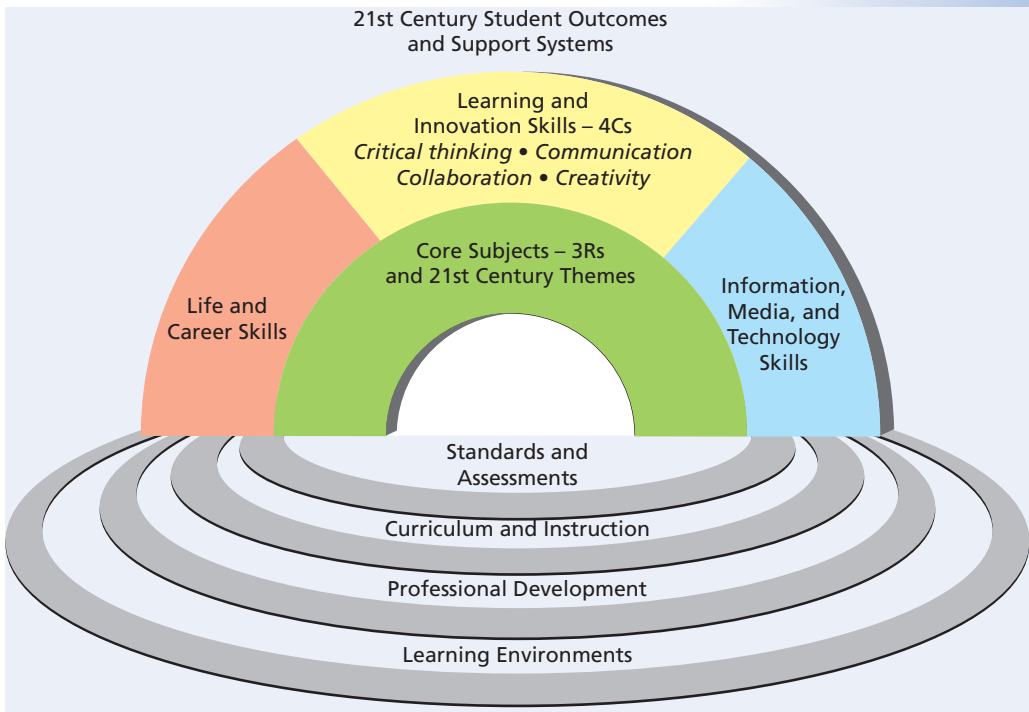
Technology functions as both the fuel and the tool for educational change: Its importance in life and work necessitates a subsequent reform of curriculum and instruction, and technology itself can be a tool that facilitates this reform in classrooms and schools. Whether in a traditional classroom or a virtual one, students require both the foundations of academic knowledge and the real-life experiences that prepare them for citizenship in today's society. More and more, that means understanding and being able to use technology.

Reforms inspired by digital technology demand a transformation of what is taught and how it is taught in American schools. Such reforms are being championed by two different professional organizations—the Partnership for 21st Century Skills (P21) and the International Society for Technology in Education (ISTE). These organizations are influencing education at all levels through articulated standards for successful 21st century education. The P21 Framework and the ISTE's National Educational Technology Standards for Students (NETS•S) are structured guidelines that group and outline essential 21st century aptitudes. These two sets of standards provide guidance to states, schools, and educators alike. Teachers who approach instruction as educational designers need to know about the aptitudes these guidelines promote, and they must address them in their classroom practice.

THE P21 SKILLS FRAMEWORK. Formed in 2002, P21 (www.p21.org) is a U.S. organization composed of educational, governmental, and business leaders that advocates for the 21st century readiness of all learners. P21 has developed a comprehensive framework (see Figure 1-1) articulating the competencies that are required for successful employment and citizenship in the 21st century.

The P21 Framework acknowledges the continued role of traditional curricular subjects, or the "3Rs" (reading, writing, and arithmetic). However, this framework suggests that achievement in the digital era will require more than this curricular foundation. It highlights the importance of the "4Cs"—creativity, communication, collaboration, and critical thinking. It proposes that the 4Cs are as important as the 3Rs to college readiness and workforce success. The framework also promotes the development of lifelong learning skills

Figure 1-1 Framework for 21st Century Learning



Partnership for 21st Skills, www.P21.org

that will be necessary for success in and beyond the imagined future. The P21 Framework communicates specific student outcomes educators should focus on when making decisions that affect curriculum and instruction. These indicators focus on four major areas:

1. Core Subjects and 21st Century Themes
2. Learning and Innovation Skills
3. Information, Media, and Technology Skills
4. Life and Career Skills

Formally and informally, the P21 framework is reforming what is taught and how it is taught in schools across the nation. In fact, nearly 20 states have committed to serving as P21 leadership states. These states have committed to design new standards, assessments, and professional development programs that correspond to the P21 framework. The framework is commonly integrated with grant initiatives at the state and federal levels, and P21 has even informed the development of national and international educational standards, such as the Common Core State Standards and ISTE's NETS•S.

ISTE'S NETS•S.[1] The ISTE is a group of education leaders from around the globe who have worked for over 30 years to improve education through innovative and effective uses of technology. The group provides general information (via books, websites, and other resources) and support (via conferences, workshops, and other professional development tools) related to this goal. ISTE's NETS•S, originally developed in 1998 and later revised in

[1]National Educational Technology Standards for Students (NETS•S), Second Edition © 2007 ISTE ® (International Society for Technology in Education), www.iste.org. All rights reserved.

2008, describe in five domains what students must know and do for successful 21st century living and learning. These domains include the following:

1. Creativity and Innovation
2. Communication and Collaboration
3. Research and Information Fluency
4. Digital Citizenship
5. Technology Operations and Concepts

The NETS•S are used to develop educational offerings at all levels. They not only provide curriculum standards used in courses focused on the development of technology competencies but also help to integrate technology competency into traditional academic subject areas. The NETS•S have served as a blueprint for cultivating 21st century learning for more than a decade, and their impact is compounded when combined with the P21 Framework. Indeed, the P21 Framework and NETS•S illustrate the learning outcomes that will enable 21st century learners to be well prepared for an ever changing tomorrow.

Students do not develop technological competence without appropriate support from the adults who work with them. Anticipating this, ISTE developed additional sets of standards that assist in the preparation of school administrators (NETS•A), teachers (NETS•T), and coaches (NETS•C). Each set of standards expresses the knowledge, attitudes, habits, and skills adults must have to lead, teach, and support their students' development of technological competence.

Clearly, the P21 Framework and NETS•S are important for contemporary teachers to know about and utilize in their practice. These recommendations both inform and guide teachers who want their students to develop the skills, knowledge, and competencies necessary to live a productive, technologically competent life. Awareness of these standards and the reforms they inspire also helps teachers appreciate why a new mind-set, an expanded skill set, and a high-quality tool set are essential for effective teaching in the 21st century.

Access to Information

Anytime, anywhere access to information is one of the defining characteristics of the 21st century. Today, access to information is fast and convenient. It is also abundant. Although researchers are challenged to quantify the world's technological capacity, there is no question that the quantity of data stored, communicated, and computed is growing exponentially. This is not expected to change anytime soon, as access to advanced technological infrastructures (e.g., broadband technologies) increases around the world (Hilbert & Lopez, 2011). Although access to information still remains a challenge for some individuals and in some communities, a different challenge exists where it is plentiful: knowing how to evaluate, synthesize, apply, and benefit from information without being overwhelmed by it.

In most developed societies, information is accessible everywhere and anytime—including classrooms during the school day. Contemporary teachers can conveniently access digital text and multimedia resources that present content across the academic disciplines. Students' access to content is no longer limited to the hard-copy resources available in the school library or confined by the walls of the school. Lessons and activities may be made more relevant through the inclusion of "real-world" information from experts, researchers, and the media. Ideas, discoveries, and insights that expand students' understanding of academic content from around the world can now be accessed and discussed within classrooms. New information sources (e.g., blogs, online videos, wikis, and discussion boards) allow firsthand experiences and eyewitness accounts to be shared,

complementing traditionally accepted sources. In short, the exponential growth and wide-reaching nature of information in most school environments creates many new opportunities for teaching and learning today.

As curriculum and instruction evolve in response to this trend, so does our understanding of the nature of knowledge and the methods required for its successful acquisition. Experts, such as those who study information processing, have refined their understanding of human cognition and the acquisition of knowledge in recent decades. These ideas are becoming more influential and mainstream in the field of education. An example of this trend is present in the recent revision of Bloom's taxonomy (Anderson et al., 2001). The taxonomy, originally published in 1956, was updated in 2001 to integrate new understandings gained from studies conducted over the last half century. Understanding what the taxonomy suggests about the types of knowledge and methods for promoting student learning will aid in the work of educational designers as well as the application of teaching models presented in this text.

REVISED BLOOM'S TAXONOMY: A NEW DESCRIPTION OF 21ST CENTURY KNOWLEDGE AND THINKING SKILLS. For the last 50 years, Bloom's taxonomy has provided a useful understanding of the types of cognitive processes that humans are capable of demonstrating. It has also illuminated the skills that students must develop to be successful in life and work. The ideas expressed in the taxonomy and related works have been foundational for the development of existing curricula and instruction in U.S. schools. The revised taxonomy was developed to better support the "design and implementation of accountability programs, standards-based curriculums, and authentic assessments" (2001, p. xxii). The most obvious change, for those familiar with the taxonomy, is a shift from passive (original) to more active (revised) cognitive process categories. Figure 1-2 depicts the revised Bloom's taxonomy.

The most important change, however, is the addition of a "knowledge dimension" to the existing cognitive process categories, resulting in a multidimensional matrix. The change, intended to incorporate developments in cognitive psychology, brings to the mainstream education community an illustration of how cognitive processes relate to the formation

Figure 1-2 The Revised Bloom's Taxonomy

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual						
Procedural						
Metacognitive						

of different types of knowledge. It also describes how this knowledge must be supported through different categories of cognitive process dimensions.

The revised Bloom's taxonomy knowledge dimension suggests that there are four general knowledge types. Each has its own characteristics, which are described here briefly. For more in-depth information, read the Anderson et al. (2001) text, *A Taxonomy for Learning, Teaching, and Assessing*. **Factual knowledge** comprises the basic and essential elements a person must know (e.g., key vocabulary). **Conceptual knowledge** consists of knowledge of the relationship between classifications and categories. **Procedural knowledge** is knowledge about how to do something and when it is appropriate, and **metacognitive knowledge** comprises knowledge about cognitive tasks and one's own cognition. Each type of knowledge is distinct and important, and each can be gained through different cognitive processes. Deep understanding of knowledge is developed over time and through experiences that incorporate the varied types of cognition.

The revised taxonomy is highly practical and intended to be used as a tool in the design of curriculum, instruction, and assessment. It fosters systematic thinking about the analysis of content standards and the development of learning experiences that promote specific instructional objectives. Functionally, teachers can support their students' mastery of specific learning objectives by developing activities that integrate the different knowledge types and cognitive process categories. For example, a teacher might design a lesson targeting an objective related to a specified knowledge type and then orchestrate activities that incorporate varying levels of cognitive processes to promote student mastery. Using the taxonomy as a visual aid, teachers can ensure that students acquire knowledge of all types at graduated levels of complexity and understanding.

The description of the knowledge types presented in the revised taxonomy's "knowledge domain" challenges the profession's prevailing view that knowledge consists of only two types—declarative (i.e., knowledge about something) and procedural (i.e., knowledge about how to do something). In the information-abundant 21st century, the types of knowledge students must acquire and apply are not only more numerous but also more varied. Teachers approaching their work as educational designers will broaden and strengthen their skill set if they learn to use the revised taxonomy when developing lessons, activities, and units for their students.

Globalization

Globalization, the increasing interconnectedness of economies, communities, and individuals around the world, is another powerful trend in the 21st century. As globalization becomes more pervasive, a larger percentage of individuals have more of their existence affected by what goes on in the economies, environments, and governments of other countries. Technologies facilitate globalization because they make relocation, communication, and economic relationships easier, faster, and more productive. In particular, the rise of publicly accessible global communication channels like the Internet has enabled a faster, more egalitarian exchange of information resources among individuals and groups. As a result, our view of the world is broader than ever before—and is constantly changing.

Globalization has affected the lives of contemporary teachers in numerous ways. For one, it has resulted in increased ethnic and cultural diversity across student populations. Many classrooms across the United States have a greater representation of cultural, religious, and ethnic diversity than ever before. Changing immigration patterns in particular have resulted in more widespread occurrences of cultural and ethnic diversity across