Preface

Instructional Technology and Media for Learning, 11th edition, shows how a complete range of technology and media formats can be integrated into classroom instruction using the ASSURE model for lesson planning. Written from the viewpoint of the teacher, the text shows specifically and realistically how technology and media fit into the daily life of the classroom. This book is intended for educators at all levels who place a high value on learning. Its purpose is to help educators incorporate technology and media into their repertoire—to use them as teaching tools and to guide students in using them as learning tools. We draw examples from elementary and secondary education because we know that instructors in these PK–12 settings have found previous editions of this book useful in their work.

This new edition is necessitated by the amazing pace of innovation in all aspects of technology, particularly in those related to computers and mobile technologies and the Internet. The text has been updated to reflect the accelerating trend toward digitizing information and school use of telecommunications resources, such as the Web. The 11th edition also addresses the interaction among the roles of teachers, technology coordinators, and school media specialists, all complementary and interdependent teams within the school.

New to This Edition

- Embedded video in the Pearson eText* enriches your experience with the text by allowing you to see real teachers in real classrooms, and shares their insights.
- Pop-up Selection Rubrics*, which are printable, aid in the process of selecting classroom technology materials.
- Web links at point-of-use help you further explore topics discussed.
- Revised chapters have updated information about designing instruction for 21st century learning, including the Common Core State Standards.
- Current technologies to support learning are identified and include overviews of how to use them with students of all ages.
- End-of-chapter activities guide the user through teacher performance assessment using the ISTE NETS as part of the process.
- Taking a Look at Technology Integration features are updated with examples of how actual classroom teachers use technology to support student learning. The examples place emphasis on integrating the 21st century skills and the Common Core Learning Standards.
- Increased focus is given to enhancing the use of classroom technology to meet the learning needs of all students. With the advent of Response to Intervention (RtI), classroom teachers are expected to meet the learning needs of their students. We have expanded the Technology for All Learners feature to help consider options that will be useful to facilitate learning experiences for all students in the classroom.

The Pearson eText* for this title is an affordable, interactive version of the print text that includes videos, pop-up content, and links to additional information. The play button appears where video is available, while hyperlinked words provide access to pop-ups and other related websites.

Go to **www.pearsonhighered.com/etextbooks** to learn more about the enhanced Pearson eText for *Instructional Technology and Media for Learning*.

*These enhancements are only available through the Pearson eText, and not other third-party eTexts such as CourseSmart or Kindle.

Our Approach

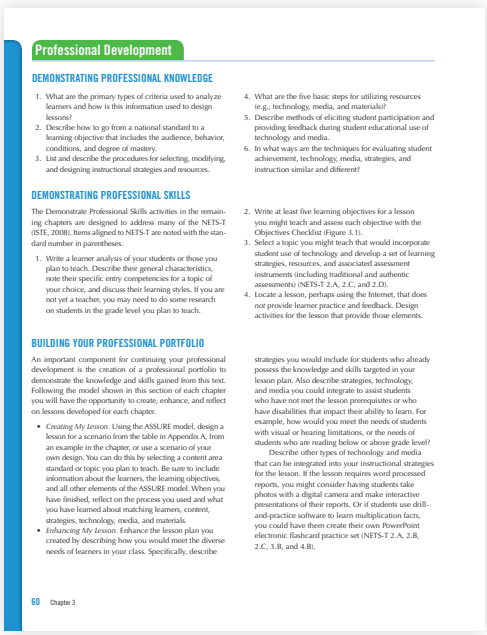
We share a number of convictions that underlie this edition. First, we believe in an *eclectic* approach to instruction. Advocates cite an abundance of theories and philosophies in support of different approaches to instruction—behaviorist, cognitivist, constructivist, and social-psychological. We view these theoretical positions as differing *perspectives*—different vantage points—from which to examine the complex world of teaching and learning. We value each of them and feel that each is reflected in the guidance we offer.

Second, we have a balanced posture regarding the role of technology in instruction. Because of this perspective, we consider each technology in light of its advantages, limitations, and range of applications. No technology can be described solely as being either "good" or "bad," so we strive to give a balanced treatment to a range of technologies and media resources.

Third, we believe that technology can best be integrated into instruction when viewed from a teacher's perspective. Therefore, throughout the book, we attempt to approach technology and media solutions in terms of a teacher's day-to-day challenges and to avoid technical jargon as much as possible. Our examples deal with everyday teaching issues in a range of content areas.

The ASSURE Model for Technology Integration

In this edition, the explanation of the ASSURE model has been revised to be more clear, practical, and focused on PK–12 teaching and learning. The text offers several chapter features (Classroom Case Study and Classroom Case Study Reflection) that show how teachers can effectively integrate technology and media into instruction, all in the context of each chapter's content. Chapters 3 through 9 open with a video feature that offers an example of how one teacher uses technology to augment the learning experiences of the students.



Professional Development

DEMONSTRATING PROFESSIONAL KNOWLEDGE

1. What are the primary types of criteria used to analyze learners and how is this information used to design lessons?
2. Describe how to go from a national standard to a learning objective that includes the audience, behavior, conditions, and degree of mastery.
3. List and describe the procedures for selecting, modifying, and designing instructional strategies and resources.
4. What are the five basic steps for utilizing resources (e.g., technology, media, and materials)?
5. Describe methods of eliciting student participation and providing feedback during student educational use of technology and media.
6. In what ways are the techniques for evaluating student achievement, technology, media, strategies, and instruction similar and different?

DEMONSTRATING PROFESSIONAL SKILLS

The Demonstrate Professional Skills activities in the remaining chapters are designed to address many of the NETS-T (ISTE, 2008). Items aligned to NETS-T are noted with the standard number in parentheses.

1. Write a learner analysis of your students or those you plan to teach. Describe their general characteristics, note their specific entry competencies for a topic of your choice, and discuss their learning styles. If you are not yet a teacher, you may need to do some research on students in the grade level you plan to teach.
2. Write at least five learning objectives for a lesson you might teach and assess each objective with the Objectives Checklist (Figure 3.1).
3. Select a topic you might teach that would incorporate student use of technology and develop a set of learning strategies, resources, and associated assessment instruments (including traditional and authentic assessments) (NETS-T 2.A, 2.C, and 2.D).
4. Locate a lesson, perhaps using the Internet, that does *not* provide learner practice and feedback. Design activities for the lesson that provide those elements.

BUILDING YOUR PROFESSIONAL PORTFOLIO

An important component for continuing your professional development is the creation of a professional portfolio to demonstrate the knowledge and skills gained from this text. Following the model shown in this section of each chapter you will have the opportunity to create, enhance, and reflect on lessons developed for each chapter.

- *Creating My Lesson.* Using the ASSURE model, design a lesson for a scenario from the table in Appendix A, from an example in the chapter, or use a scenario of your own design. You can do this by selecting a content area standard or topic you plan to teach. Be sure to include information about the learners, the learning objectives, and all other elements of the ASSURE model. When you have finished, reflect on the process you used and what you have learned about matching learners, content, strategies, technology, media, and materials.
- *Enhancing My Lesson.* Enhance the lesson plan you created by describing how you would meet the diverse needs of learners in your class. Specifically, describe strategies you would include for students who already possess the knowledge and skills targeted in your lesson plan. Also describe strategies, technology, and media you could integrate to assist students who have not met the lesson prerequisites or who have disabilities that impact their ability to learn. For example, how would you meet the needs of students with visual or hearing limitations, or the needs of students who are reading below or above grade level?

  Describe other types of technology and media that can be integrated into your instructional strategies for the lesson. If the lesson requires word processed reports, you might consider having students take photos with a digital camera and make interactive presentations of their reports. Or if students use drill-and-practice software to learn multiplication facts, you could have them create their own PowerPoint electronic flashcard practice set (NETS-T 2.A, 2.B, 2.C, 3.B, and 4.B).

60 Chapter 3

Focus on Professional Development

The "Professional Development" feature helps readers develop their ongoing professional knowledge and skills with regard to effectively using technology and media for learning.

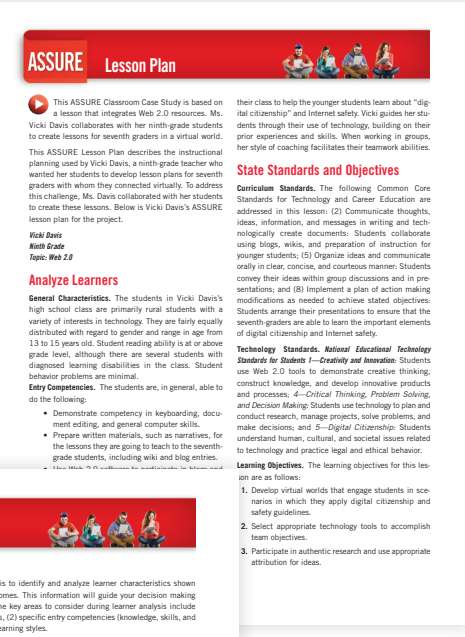
The first section, "Demonstrate Professional Knowledge," poses questions based on the Knowledge Outcomes at the beginning of each chapter. In the next section, "Demonstrate Professional Skills," readers integrate their learning through activities that are aligned with the ISTE NETS for Teachers. The final section, "Build Your Professional Portfolio," includes three parts: Creating My Lesson, Enhancing My Lesson, and Reflecting on My Lesson. These are also linked to the ISTE NETS for Teachers.

- "Creating My Lesson" asks readers to select their own topics and settings for developing lessons that integrate the technology and media discussed in the chapter. Chapter-specific questions help readers make decisions to create their own lesson plan using appropriate instructional strategies, technology, and media.
- "Enhancing My Lesson" asks the reader to describe other strategies, technology, media, and materials that could enhance the lesson. The reader addresses how the lesson could be enhanced to meet the diverse needs of learners, including students who already possess the knowledge and skills targeted in the lesson plan.

- **Reflecting on My Lesson** prompts readers to reflect on their lesson, the process used to develop it, and different types of students who could benefit from it. Readers are also asked to reflect on what they learned about the process of matching audience, content, strategies, technology, media, and materials.

Special Features

The ASSURE Model for Technology Integration. Chapter opening "ASSURE Classroom Case Studies" (in Chapters 3 through 9) each presents a video clip of a specific classroom that will be revisited periodically throughout the chapter in the "ASSURE Case Study Reflections." These are brief notes and reflection questions that extend the opening case study by addressing the questions that a teacher may face when considering technology integration in the context of specific chapter content. At the end of the chapter, the "ASSURE Lesson Plan" provides a fuller version of the instructional or classroom situation outlined at the beginning of the chapter and offers a possible solution.


ASSURE Lesson Plan

This ASSURE Classroom Case Study is based on a lesson that integrates Web 2.0 resources. Ms. Vicki Davis collaborates with her ninth-grade students to create lessons for seventh graders in a virtual world.

This ASSURE Lesson Plan describes the instructional planning used by Vicki Davis, a ninth-grade teacher who wanted her students to develop lesson plans for seventh graders with whom they connected virtually. To address this challenge, Ms. Davis collaborated with her students to create these lessons. Below is Vicki Davis's ASSURE lesson plan for the project.

Vicki Davis
Ninth Grade
Topic: Web 2.0

Analyze Learners

General Characteristics. The students in Vicki Davis's high school class are primarily rural students with a variety of interests in technology. They are fairly equally distributed with regard to gender and range in age from 13 to 15 years old. Student reading ability is at or above grade level, although there are several students with diagnosed learning disabilities in the class. Student behavior problems are minimal.

Entry Competencies. The students are, in general, able to do the following:

- Demonstrate competency in keyboarding, document editing, and general computer skills.
- Prepare written materials, such as narratives, for the lessons they are going to teach to the seventh-grade students, including wiki and blog entries.

State Standards and Objectives

Curriculum Standards. The following Common Core Standards for Technology and Career Education are addressed in this lesson: (2) Communicate thoughts, ideas, information, and messages in writing and technologically create documents: Students collaborate using blogs, wikis, and preparation of instruction for younger students; (5) Organize ideas and communicate orally in clear, concise, and courteous manner: Students convey their ideas within group discussions and in presentations; and (8) Implement a plan of action making modifications as needed to achieve stated objectives: Students arrange their presentations to ensure that the seventh-graders are able to learn the important elements of digital citizenship and Internet safety.

Technology Standards. *National Educational Technology Standards for Students 1—Creativity and Innovation:* Students use Web 2.0 tools to demonstrate creative thinking, construct knowledge, and develop innovative products and processes; *4—Critical Thinking, Problem Solving, and Decision Making:* Students use technology to plan and conduct research, manage projects, solve problems, and make decisions; and *5—Digital Citizenship:* Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

Learning Objectives. The learning objectives for this lesson are as follows:

1. Develop virtual worlds that engage students in scenarios in which they apply digital citizenship and safety guidelines.
2. Select appropriate technology tools to accomplish team objectives.
3. Participate in authentic research and use appropriate attribution for ideas.


ASSURE A Model to Help Assure Learning

Analyze Learners
The first step in planning a lesson is to identify and analyze learner characteristics shown to be associated with learning outcomes. This information will guide your decision making during the design of your lesson. The key areas to consider during learner analysis include (1) general characteristics of learners, (2) specific entry competencies (knowledge, skills, and attitudes about the topic), and (3) learning styles.

State Standards and Objectives
The next step is to state the standards and learning objectives as specifically as possible. Begin with curriculum and technology standards adopted by your district, as these are based on state and national student performance criteria. Well-stated objectives name the learners for whom the objective is intended, the action (behavior) to be demonstrated, the conditions under which the behavior or performance will be observed, and the degree to which the new knowledge or skill must be mastered. For this text, the condition will include the use of technology and media to support learning and to assess achievement of the standard or learning objectives.

Select Strategies and Resources
Once you have analyzed your learners and stated the standards and objectives, you have established the beginning points (students' present knowledge, skills, and attitudes) and ending points (learning objectives) of instruction. Your task now is to build a bridge between these two points by choosing appropriate instructional strategies and resources to achieve the objectives.

Utilize Resources
This step involves planning your teaching role for utilizing the resources (technology, media, and materials) to help students achieve the learning objectives. To do this, follow the 5 Ps process: Preview the resources; Prepare the resources; Prepare the environment; Prepare the learners; and Provide the learning experience.

Require Learner Participation
To be effective, instruction should require learners' active mental engagement. Provide activities that allow them to practice the new knowledge or skills and to receive feedback on their efforts before being formally assessed. Practice may involve student self-checks, computer-assisted instruction, Internet activities, or group exercises. Feedback can come from the teacher, a computer, other students, or self-evaluation.

Evaluate and Revise
After implementing a lesson, evaluate its impact on student learning. This assessment not only examines the degree to which students achieved the learning objectives, but also examines the entire instructional process and the impact of using technology and media. Wherever there are discrepancies between learning objectives and student outcomes, revise the lesson plan to address the areas of concern.

Integrating Technology and Media into Instruction: The ASSURE Model 39

ASSURE Classroom Case Study Reflection

Review the ASSURE Classroom Case Study and video at the beginning of the chapter. What kinds of learning experiences can Mr. Chun offer his students? How can he capitalize on the types of learning opportunities to ensure all his students have access to the information?

shipping printed materials or computer disks to schools. Electronic learning provides flexibility to students as well because they may study materials at any time and at any location. Students can also take tests over the intranet. Once the answers are in the database, they are scored and the results are made available immediately to students and the teacher. Online learning is very useful when learners are geographically dispersed and instruction is updated frequently.

Network Resources

It is common knowledge that computers can be used to con resources outside of the classroom. Once you connect computers communicate and share information, you have a **network.** Netw libraries, organizations, and businesses so that students, families, or share information and instruction instantly in several ways.

TYPES OF NETWORKS

LAN. The simplest of all networks is a **local area network (LAN** within a limited area, normally a classroom, building, or labora individual computers to one another to permit exchange of files ar a centralized computer called a **file serv** to it. A computer lab is often itself a LA in the lab are con usually tucked awa the-way space. Wh nected to a local single computer th media center, whi server. Through a l a school can have tion of software. M ers and students to personalized folde useful when multip It also allows teach such as a PowerPoi computer lab.

Within a sch a technology coo might otherwise inventorying softw Coordinators can ing with teachers machines and softw center can store it file server, giving access to the infor topic.

Workstation

Workstation

Hard-disk storage


ASSURE Classroom Case Study

The ASSURE Classroom Case Study for this chapter describes the instructional strategies used by teachers Lindsay Kaiser and Iena Marshall, who co-teach a fifth-grade social studies class at a school in a middle-income rural neighborhood. The students read at or above grade level and are experienced users of a variety of technology applications. Each student is equipped with a laptop with high-speed Internet access. The teachers are challenged by the students' lack of interest in U.S. history and try to address this concern by engaging students in a variety of activities about the Lewis and Clark expedition. A key activity includes designing a boat that could have been used by Lewis and Clark. The lesson begins with student pairs completing an interactive Lewis and Clark WebQuest to learn about the expedition and various "boat issues" they faced. To assist with the boat design, students conduct Internet searches to expand on information learned from the WebQuest. Students create an advertisement to sell their boat and write a letter to the president of a boat manufacturing company to seek interest in reproducing the Lewis and Clark boat. The students with the best design will receive an award.

Throughout the chapter you will find reflection questions to relate the chapter content to the ASSURE Classroom Case Study. At the end of the chapter you will be challenged to develop your own ASSURE lesson that incorporates use of these strategies, technology, media, and materials, for a topic and grade level of your choice. Click the ASSURE Video Link to view Ms. Kaiser and Ms. Marshall and their class as they develop videos of natural disasters.

Click the Video Link to explore how Ms. Kaiser and Ms. Marshall use strategies, technology, media, and materials to achieve 21st century learning environments.

As we explore a variety of instructional strategies and settings, such as the cooperative learning arrangement used by Ms. Kaiser and Ms. Marshall, we examine foundational components of a 21st century learning environment. First, we discuss important distinctions between teacher- and student-centered strategies. Next we examine 10 commonly used instructional strategies, discussing the advantages and limitations of each and offering ideas for integrating technology and media. Following that is an introduction to how to use technology and media to support learning experiences. The final section provides ideas for integrating free and inexpensive materials into instruction, their advantages and limitations, and suggestions for obtaining and evaluating them. As you will see, well-planned instructional strategies supported with appropriate technology and media not only promote student learning, but also better prepare students for 21st century careers.

21st Century Learning Environments

The explosion of information available in the 21st century requires teachers to create learning environments that engage this new generation of students in authentic experiences that promote increased knowledge and skills and a better understanding of the world around them. As seen in Figure 4.1, the 21st century learning environment encompasses learning strategies that are teacher-centered or student-centered; integration of technology, media,

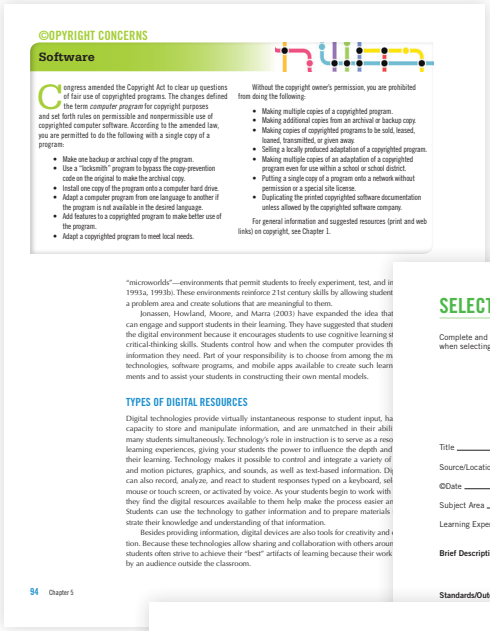
FIGURE 4.1 21st Century Learning Environment Components

Instructional Strategies
• Teacher-centered
• Student-centered

Learning Context
• Face-to-face
• Distant learning
• Blended instruction
• Independent study
• Informal study

Integration
• Technology
• Media
• Materials

Designing 21st Century Learning Environments 63


©OPYRIGHT CONCERNS

Software

Congress amended the Copyright Act to clear up questions of fair use of copyrighted programs. The changes defined the term *computer program* for copyright purposes and set forth rules on permissible and nonpermissible use of copyrighted computer software. According to the amended law, you are permitted to do the following with a single copy of a program:

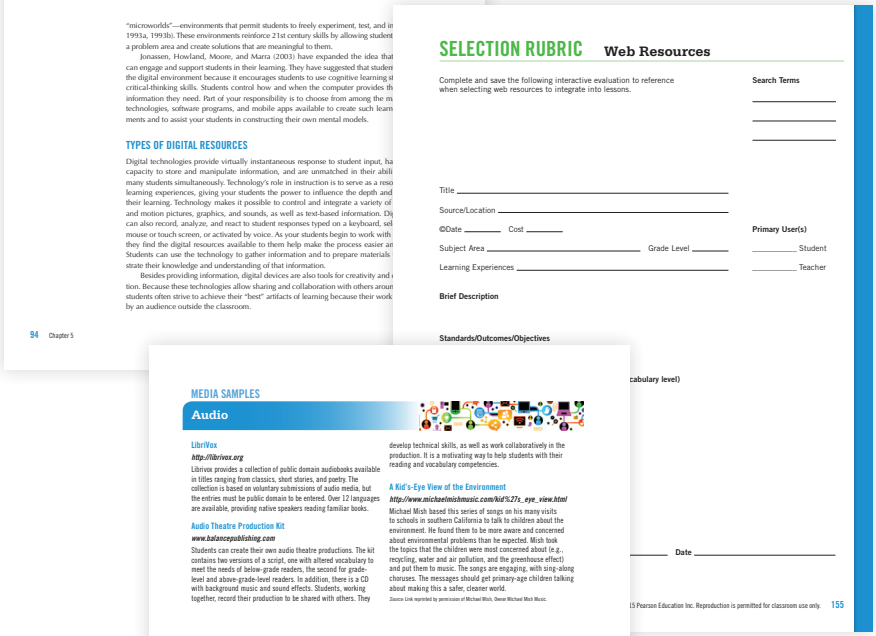
- Make one backup or archival copy of the program.
- Use a "locksmith" program to bypass the copy-prevention code on the original to make the archival copy.
- Install one copy of the program onto a computer hard drive.
- Adapt a computer program from one language to another if the program is not available in the desired language.
- Add features to a copyrighted program to make better use of the program.
- Adapt a copyrighted program to meet local needs.

Without the copyright owner's permission, you are prohibited from doing the following:

- Making multiple copies of a copyrighted program.
- Making additional copies from an archival or backup copy.
- Making copies of copyrighted programs to be sold, leased, loaned, transmitted, or given away.
- Selling a locally produced adaptation of a copyrighted program.
- Making multiple copies of an adaptation of a copyrighted program even for use within a school or school district.
- Putting a single copy of a program onto a network without permission or a special site license.
- Duplicating the printed copyrighted software documentation unless allowed by the copyrighted software company.

For general information and suggested resources (print and web links) on copyright, see Chapter 1.

Copyright Concerns. This feature provides an integrated discussion of copyright issues linked to specific chapter content.


"microworlds"—environments that permit students to freely experiment, test, and in
1993a, 1993b). These environments reinforce 21st century skills by allowing student
a problem area and create solutions that are meaningful to them.

Jonassen, Howland, Moore, and Marra (2003) have expanded the idea that
can engage and support students in their learning. They have suggested that studen
the digital environment because it encourages students to use cognitive learning st
critical-thinking skills. Students control how and when the computer provides th
information they need. Part of your responsibility is to choose from among the m
technologies, software programs, and mobile apps available to create such learn
ments and to assist your students in constructing their own mental models.

TYPES OF DIGITAL RESOURCES

Digital technologies provide virtually instantaneous response to student input, ha
capacity to store and manipulate information, and are unmatched in their abili
many students simultaneously. Technology's role in instruction is to serve as a reso
learning experiences, giving your students the power to influence the depth and
their learning. Technology makes it possible to control and integrate a variety of
and motion pictures, graphics, and sounds, as well as text-based information. Di
can also record, analyze, and react to student responses typed on a keyboard, sel
mouse or touch screen, or activated by voice. As your students begin to work with
they find the digital resources available to them help make the process easier ar
Students can use the technology to gather information and to prepare materials
strate their knowledge and understanding of that information.

Besides providing information, digital devices are also tools for creativity and
tion. Because these technologies allow sharing and collaboration with others arou
students often strive to achieve their "best" artifacts of learning because their work
by an audience outside the classroom.

94 Chapter 5

SELECTION RUBRIC Web Resources

Complete and save the following interactive evaluation to reference when selecting web resources to integrate into lessons.

Search Terms

Title

Source/Location

©Date Cost

Primary User(s)

Subject Area Grade Level

Student

Learning Experiences

Teacher

Brief Description

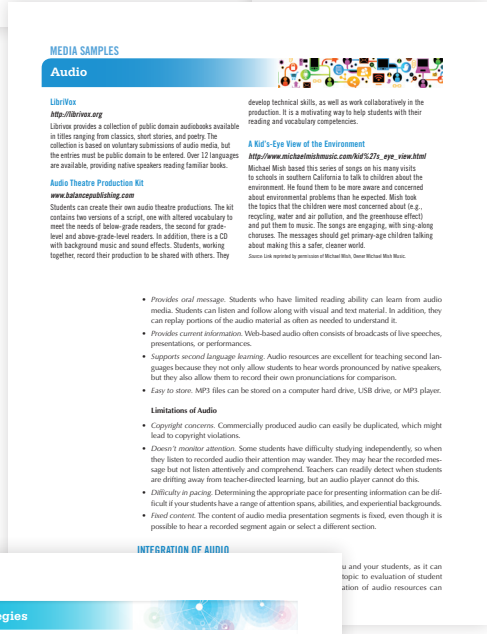
Standards/Outcomes/Objectives

cabulary level)

Date

5 Pearson Education Inc. Reproduction is permitted for classroom use only. 155

Selection Rubrics. These rubrics, which pop up in the Pearson e-Text* version of the book, are related to each of the technology and media formats, making it easy to preview materials systematically and to preserve the information for later reference. Textbook users have permission to print these rubrics for personal use.


MEDIA SAMPLES

Audio

LibriVox

http://librivox.org

Librivox provides a collection of public domain audiobooks available in titles ranging from classics, short stories, and poetry. The collection is based on voluntary submissions of audio media, but the entries must be public domain to be entered. Over 12 languages are available, providing native speakers reading familiar books.

Audio Theatre Production Kit

www.balancepublishing.com

Students can create their own audio theatre productions. The kit contains two versions of a script, one with altered vocabulary to meet the needs of below-grade readers, the second for grade-level and above-grade-level readers. In addition, there is a CD with background music and sound effects. Students, working together, record their production to be shared with others. They develop technical skills, as well as work collaboratively in the production. It is a motivating way to help students with their reading and vocabulary competencies.

A Kid's-Eye View of the Environment

http://www.michaelmishmusic.com/kid%27s_eye_view.html

Michael Mish based this series of songs on his many visits to schools in southern California to talk to children about the environment. He found them to be more aware and concerned about environmental problems than he expected. Mish took the topics that the children were most concerned about (e.g., recycling, water and air pollution, and the greenhouse effect) and put them to music. The songs are engaging, with sing-along choruses. The messages should get primary-age children talking about making this a safer, cleaner world.

Source: Link reprinted by permission of Michael Mish, Owner Michael Mish Music.

- *Provides oral message.* Students who have limited reading ability can learn from audio media. Students can listen and follow along with visual and text material. In addition, they can replay portions of the audio material as often as needed to understand it.
- *Provides current information.* Web-based audio often consists of broadcasts of live speeches, presentations, or performances.
- *Supports second language learning.* Audio resources are excellent for teaching second languages because they not only allow students to hear words pronounced by native speakers, but they also allow them to record their own pronunciations for comparison.
- *Easy to store.* MP3 files can be stored on a computer hard drive, USB drive, or MP3 player.

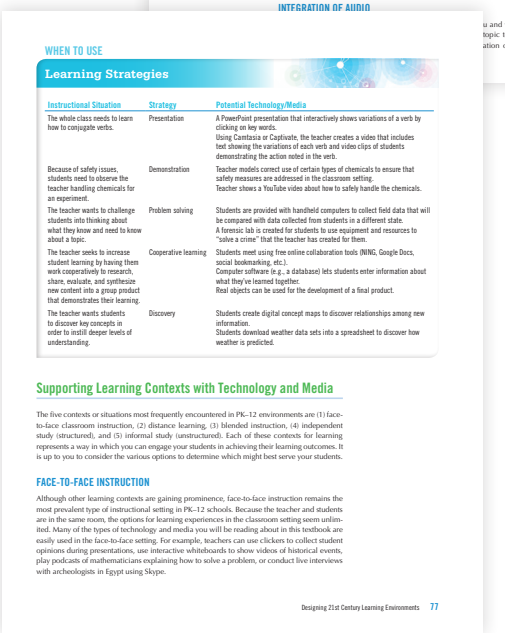
Limitations of Audio

- *Copyright concerns.* Commercially produced audio can easily be duplicated, which might lead to copyright violations.
- *Doesn't monitor attention.* Some students have difficulty studying independently, so when they listen to recorded audio their attention may wander. They may hear the recorded message but not listen attentively and comprehend. Teachers can readily detect when students are drifting away from teacher-directed learning, but an audio player cannot do this.
- *Difficulty in pacing.* Determining the appropriate pace for presenting information can be difficult if your students have a range of attention spans, abilities, and experiential backgrounds.
- *Fixed content.* The content of audio media presentation segments is fixed, even though it is possible to hear a recorded segment again or select a different section.

INTEGRATION OF AUDIO

u and your students, as it can
topic to evaluation of student
ation of audio resources can

Media Samples. This feature provides excellent online audio and video resources for students and exemplifies several examples of media-related content.


WHEN TO USE

Learning Strategies

Instructional Situation	Strategy	Potential Technology/Media
The whole class needs to learn how to conjugate verbs.	Presentation	A PowerPoint presentation that interactively shows variations of a verb by clicking on key words. Using Camtasia or Captivate, the teacher creates a video that includes text showing the variations of each verb and video clips of students demonstrating the action noted in the verb.
Because of safety issues, students need to observe the teacher handling chemicals for an experiment.	Demonstration	Teacher models correct use of certain types of chemicals to ensure that safety measures are addressed in the classroom setting. Teacher shows a YouTube video about how to safely handle the chemicals.
The teacher wants to challenge students into thinking about what they know and need to know about a topic.	Problem solving	Students are provided with handheld computers to collect field data that will be compared with data collected from students in a different state. A forensic lab is created for students to use equipment and resources to "solve a crime" that the teacher has created for them.
The teacher seeks to increase student learning by having them work cooperatively to research, share, evaluate, and synthesize new content into a group product that demonstrates their learning.	Cooperative learning	Students meet using free online collaboration tools (NING, Google Docs, social bookmarking, etc.). Computer software (e.g., a database) lets students enter information about what they've learned together. Real objects can be used for the development of a final product.
The teacher wants students to discover key concepts in order to instill deeper levels of understanding.	Discovery	Students create digital concept maps to discover relationships among new information. Students download weather data sets into a spreadsheet to discover how weather is predicted.

Supporting Learning Contexts with Technology and Media

The five contexts or situations most frequently encountered in PK–12 environments are (1) face-to-face classroom instruction, (2) distance learning, (3) blended instruction, (4) independent study (structured), and (5) informal study (unstructured). Each of these contexts for learning represents a way in which you can engage your students in achieving their learning outcomes. It is up to you to consider the various options to determine which might best serve your students.

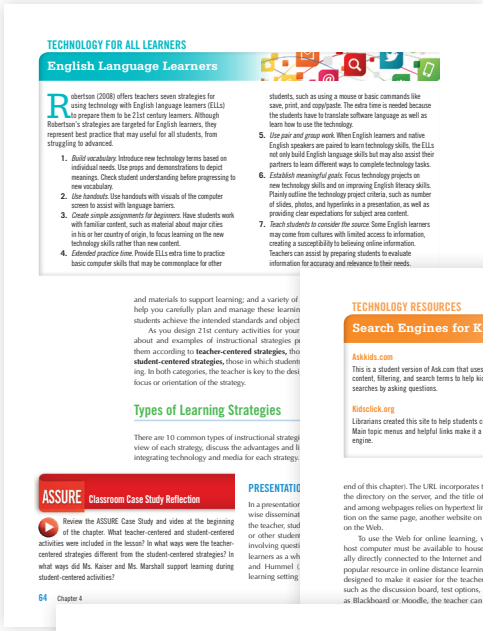
FACE-TO-FACE INSTRUCTION

Although other learning contexts are gaining prominence, face-to-face instruction remains the most prevalent type of instructional setting in PK–12 schools. Because the teacher and students are in the same room, the options for learning experiences in the classroom setting seem unlimited. Many of the types of technology and media you will be reading about in this textbook are easily used in the face-to-face setting. For example, teachers can use clickers to collect student opinions during presentations, use interactive whiteboards to show videos of historical events, play podcasts of mathematicians explaining how to solve a problem, or conduct live interviews with archeologists in Egypt using Skype.

Designing 21st Century Learning Environments 77

When to Use This feature gives specific tips on using technology and media with clarity, flair, and dramatic effect. It goes with the U of the ASSURE Model (Utilize Technology, Media, and Materials).

*Enhancements are only available in the Pearson eText, and not third-party eTexts such as CourseSmart or Kindle.


TECHNOLOGY FOR ALL LEARNERS

English Language Learners

Robertson (2008) offers teachers seven strategies for using technology with English language learners (ELLs) to prepare them to be 21st century learners. Although Robertson's strategies are targeted for English learners, they represent best practice that may useful for all students, from struggling to advanced.

1. *Build vocabulary.* Introduce new technology terms based on individual needs. Use props and demonstrations to depict meanings. Check student understanding before progressing to new vocabulary.
2. *Use handouts.* Use handouts with visuals of the computer screen to assist with language barriers.
3. *Create simple assignments for beginners.* Have students work with familiar content, such as material about major cities in his or her country of origin, to focus learning on the new technology skills rather than new content.
4. *Extended practice time.* Provide ELLs extra time to practice basic computer skills that may be commonplace for other students, such as using a mouse or basic commands like save, print, and copy/paste. The extra time is needed because the students have to translate software language as well as learn how to use the technology.
5. *Use pair and group work.* When English learners and native English speakers are paired to learn technology skills, the ELLs not only build English language skills but may also assist their partners to learn different ways to complete technology tasks.
6. *Establish meaningful goals.* Focus technology projects on new technology skills and on improving English literacy skills. Plainly outline the technology project criteria, such as number of slides, photos, and hyperlinks in a presentation, as well as providing clear expectations for subject area content.
7. *Teach students to consider the source.* Some English learners may come from cultures with limited access to information, creating a susceptibility to believing online information. Teachers can assist by preparing students to evaluate information for accuracy and relevance to their needs.

and materials to support learning; and a variety of

help you carefully plan and manage these learnin

students achieve the intended standards and object

As you design 21st century activities for your

about and examples of instructional strategies pa

them according to **teacher-centered strategies,** tho

student-centered strategies, those in which student

ing. In both categories, the teacher is key to the desi

focus or orientation of the strategy.

Types of Learning Strategies

There are 10 common types of instructional strategi

view of each strategy, discuss the advantages and li

integrating technology and media for each strategy.

ASSURE Classroom Case Study Reflection

Review the ASSURE Case Study and video at the beginning of the chapter. What teacher-centered and student-centered activities were included in the lesson? In what ways were the teacher-centered strategies different from the student-centered strategies? In what ways did Ms. Kaiser and Ms. Marshall support learning during student-centered activities?

PRESENTATIO

In a presentatio

wise disseminat

the teacher, stud

or other studen

involving questi

learners as a wh

and Hummel (

learning setting

64 Chapter 4

TECHNOLOGY RESOURCES

Search Engines for Kids

Askkids.com

This is a student version of Ask.com that uses age-appropriate content, filtering, and search terms to help kids narrow their searches by asking questions.

Kidsclick.org

Librarians created this site to help students conduct searches. Main topic menus and helpful links make it a kid-friendly search engine.

Kids.Yahoo.com

The student version of Yahoo! includes sites preselected for young people ages 7 to 12 that present information in a colorful, interactive way. Teachers have been asked to review identified sites, and there is a parent page designed to share information about Internet safety and offer suggestions for ways to help children gain value from using the Internet.

To research this media, pick a selection rubric to evaluate the media and determine which one would work with your lesson plans.

end of this chapter). The URL incorporates the name of the host computer (server), the domain, the directory on the server, and the title of the webpage (actual filename). Navigation within and among webpages relies on hypertext links that, when selected, move users to another location on the same page, another website on the same host computer, or to a different computer on the Web.

To use the Web for online learning, webpages have to be designed and written, and a host computer must be available to house them. Universities and large companies are usually directly connected to the Internet and run the necessary web-hosting (server) software. A popular resource in online distance learning, the **Course Management Tool (CMT),** is software designed to make it easier for the teacher to use the resources that are part of the system, such as the discussion board, test options, and grade book. When using a CMT program such as Blackboard or Moodle, the teacher can concentrate on the instruction and not have to be

ners on the Web that it can be dif-

A selection rubric (see **Selection**

chapter to guide you in identifying

upport your students' learning. You

lind while exploring new resources

in engineering systems to blend

world to enhance the information

ible devices such as smart phones,

the GPS capability of a smart phone

ent" or enhance knowledge about

Achieving Learning at a Distance 149

TAKING A LOOK AT TECHNOLOGY INTEGRATION

Key Pals

Rick Traw, a professor at the University of Northern Iowa, wanted to extend the experiences of his elementary education teacher candidates in language arts applications. Because of scheduling difficulties, it was impossible to arrange a visit for his students to work on writing skills with students in a nearby urban elementary school. With the aid of the Internet, however, it was possible for the elementary students to send their stories to their university "key pals" for review. The children had an exciting new audience for their writing,and the university teacher candidates had an opportunity to learn about working with emerging writers. Dr. Traw and the classroom teacher provided guidance to the college teacher candidates in techniques for assisting the young children with their writing.

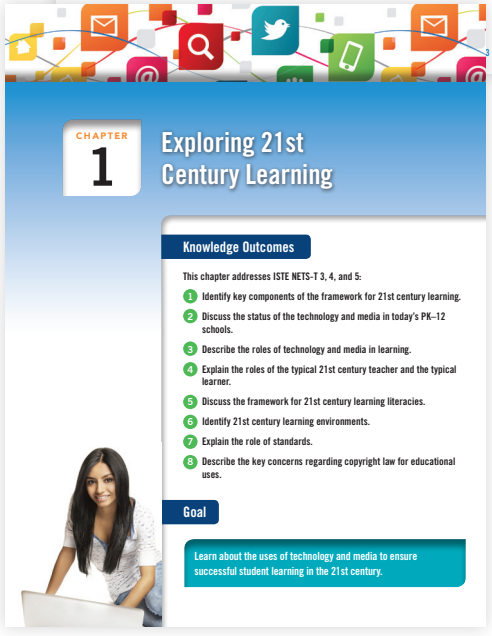
INTEGRATING WEBQUESTS

Although students can access a rich array of information on the Web, their searches often use random or low-level thinking skills. With **WebQuests** you can help your students access the Web effectively for gathering information in student-centered learning activities within the classroom (Dodge, 1999). Developed by Bernie Dodge at San Diego State University, WebQuests have been a longtime teacher favorite for infusing Internet resources into the school's curriculum to make a **hybrid,** or mixed, learning environment. A WebQuest is an inquiry-oriented simulation activity designed with specific learning outcomes in mind, in which some or all of the information that students interact with comes from resources on the Internet. Students follow a series of steps to gather information meaningful to the task:

1. *Introduction.* A scenario points to key issues or concepts to prepare the students to ask questions.
2. *Task.* Students identify issues or problems and form questions for the WebQuest.
3. *Process.* In groups, students assume roles and begin to identify the procedures they will follow to gather information to answer their questions.
4. *Sources.* Resources that will be investigated in the WebQuest are identified by the teacher and students. This is one area where the teacher helps to provide the links to websites and to ensure students have access to other support materials.
5. *Conclusion.* This is the end of the WebQuest, but it invites students to continue to investigate issues or problems. WebQuests often end with an evaluation of the process students used, along with benchmarks for achievement.

WebQuests can be applied to many types of lessons and information sources:

- Monitoring current events for social studies
- Science activities, such as tracking weather and studying space probes to other planets
- Databases of information for expository writing assignments
- Mathematics puzzles, which require logical thinking


CHAPTER 1

Exploring 21st Century Learning

Knowledge Outcomes

This chapter addresses ISTE NETS-T 3, 4, and 5:

1. Identify key components of the framework for 21st century learning.
2. Discuss the status of the technology and media in today's PK–12 schools.
3. Describe the roles of technology and media in learning.
4. Explain the roles of the typical 21st century teacher and the typical learner.
5. Discuss the framework for 21st century learning literacies.
6. Identify 21st century learning environments.
7. Explain the role of standards.
8. Describe the key concerns regarding copyright law for educational uses.

Goal

Learn about the uses of technology and media to ensure successful student learning in the 21st century.

Technology for All Learners. This feature describes technology and media that can be used to meet the learning needs of diverse learners, ranging from those with learning disabilities to gifted and talented students.

Technology Resources. Because many schools have tight budgets, this feature offers a list of practical and valuable resources that are free or inexpensive. They also inform the reader how to obtain the resources. These are listed at the ends of chapters along with helpful web links.

Taking a Look at Technology Integration. These miniature case studies of technology and media applications demonstrate how teachers are using technology in a variety of settings. Like the ASSURE Classroom Case Study, they show technology and media use *in context*.

ISTE NETS-T Alignment. At the beginning of each chapter, the ISTE NETS-T are aligned with the chapter Knowledge Outcomes. At the end of each chapter, the professional skills activities reflect the ISTE NETS-T. For each end-of-chapter activity, at least one standard has been identified. Students who successfully complete the skills activities will demonstrate that they have accomplished the standards.

Instructor Resources

The following instructor resources support and reinforce the content presented throughout the text. They are available for download under the Educator tab at www.pearsonhighered.com. Simply enter the author, title, or ISBN, and then select this textbook. Click on the Resources tab to view and download the supplements detailed below.

For more information, contact your Pearson Education sales representative.

Instructor's Resource Manual and Test Bank. (0-13-356417-7) This guide provides chapter-by-chapter tools for use in class. Teaching strategies, in-class activities, student projects, key term definitions, and helpful resources will reinforce key concepts or applications and keep students engaged. A bank of test questions for each chapter provides multiple-choice and short answer items. Test items are designed to be flexible and adaptable to meet instructional needs.

TestGen. (0-13-356965-9) This powerful test generator is available exclusively from Pearson Education publishers. You install TestGen on your personal computer (Windows or Macintosh) and create your own tests for classroom use 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 your use in creating a test, based on the associated textbook material. Assessments—including equations, graphs, and scientific notation—may be created for both print or testing online.

PowerPoint® Presentations. (0-13-356416-9) Designed as an instructional tool, the presentations can be used to present and elaborate on chapter material. They are available for both students and instructors, and they reinforce key concepts and ideas presented throughout the text. These are available for download from the Instructor Resource Center.

Authors' Services. The authors are eager to assist you in putting together an outstanding course. We offer the following services to instructors who have adopted this book:

- *Online dialog*. The authors are available to "meet" with your students if you are using an online course delivery tool such as Blackboard or Moodle.
- *Telelectures and Videoconferences*. Contact any of the authors in advance to arrange a guest lecture in your class via telephone or video. Some instructors use this technology as a demonstration of the techniques described in Chapter 7. The authors' phone numbers, fax numbers, and email addresses are listed in the Instructor's Guide.
- *Workshops*. The authors have conducted workshops at the national convention of the Association for Educational Communications and Technology (AECT). This is a forum for exchanging ideas and networking among instructors of courses on technology and media. They are also available to provide a workshop in your area if you wish to arrange one.
- *Consulting*. The authors are available for consulting and conducting workshops at the local, state, and national levels. They are regular presenters and workshop facilitators across the country and around the world.

If you are a student or an instructor using this text and wish to share your comments with us, send them to Sharon Smaldino, Northern Illinois University, Gabel Hall 155, College of Education, DeKalb, IL 60115. She can also be reached at smaldinos@comcast.net.

Acknowledgments

Through each of the editions we have been fortunate to have guidance from the people who teach the courses for which this book is designed. In preparing this edition, we again surveyed a sample of adopters and other leaders in the field to elicit their advice about content and emphases. We also asked other well-respected colleagues in the field to critique the text. We thank all those who gave their time and expertise to help make this textbook what it is. In particular, we want to acknowledge those talented individuals who reviewed the previous edition and suggested improvements: Kathleen Bacer, Azusa Pacific University; Marjorie A. Mattis, Harrisburg Area Community College; John Mikulski, Medaille College; Elena Qureshi, Madonna University; Susan R. Sutton, St. Cloud State University; and David White, Texas Tech University.

We have been lucky to have Joe Sweeney, a University of Memphis graduate student, to serve as a photographer for this edition. We wish to thank him for assistance in updating and expanding the images included in this edition.

We offer an extended appreciation to the teachers for sharing their expertise and allowing us to record their technology integration lessons: Tiare Ahu, high school; Lindsay Kaiser and Jena Marshall, fifth grade; Kerry Bird, fourth grade; Vicki Davis, high school; Jimmy Chun, high school; Christine Edlund, art, and Mary Roman, third grade; Aina Akamu, high school; Scott James, fifth grade; and Phil Ekkers, first grade.

We would like to thank the editorial and production staff of Pearson Education, specifically Meredith Fossel, Bryce Bell, Maria Feliberty, and Cynthia DeRocco. We also want to thank our copy editor for valuable editing contributions and for assistance with the content related to computers. Fair Josey provided valuable assistance in updating the PowerPoint slides and preparing the Instructor's Guide and Test Bank. We have never had such intense and helpful support from any previous publication team.

We are grateful to our colleagues from our own universities—Northern Illinois University, the University of Memphis, and Purdue University—for their many and valuable forms of support over the years.

Finally, we thank our families for all they do to make this project possible. Their patience and support have been invaluable in helping us finish this project.

Sharon E. Smaldino
Deborah L. Lowther
James D. Russell
Clif Mims

CHAPTER

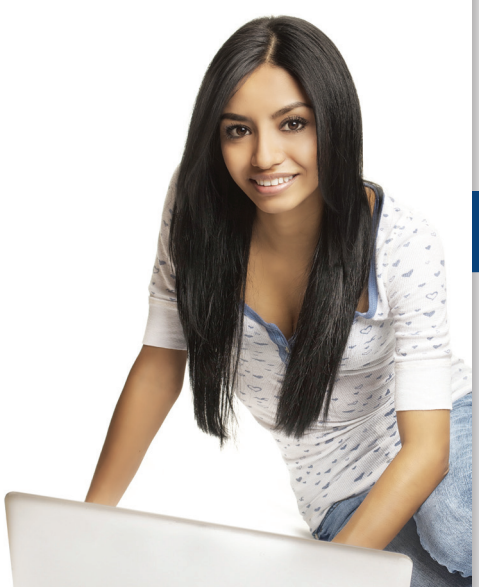
1

Exploring 21st Century Learning

Knowledge Outcomes

This chapter addresses ISTE NETS-T 3, 4, and 5:

1. Identify key components of the framework for 21st century learning.
2. Discuss the status of the technology and media in today's PK–12 schools.
3. Describe the roles of technology and media in learning.
4. Explain the roles of the typical 21st century teacher and the typical learner.
5. Discuss the framework for 21st century learning literacies.
6. Identify 21st century learning environments.
7. Explain the role of standards.
8. Describe the key concerns regarding copyright law for educational uses.



Goal

Learn about the uses of technology and media to ensure successful student learning in the 21st century.

This book offers a systematic approach for selecting and using technology and media to facilitate student learning in the 21st century. This approach is based on the ASSURE model, which helps teachers plan effective, integrated lessons by following a six-step process. Exploring both traditional technologies used in PK–12 classrooms today as well as innovative and cutting-edge approaches that may be commonplace in the future, we describe technology and media that teachers can use to promote learning both within and beyond the classroom. We describe how to select, use, and evaluate resources to ensure that learners emerge with the knowledge and skills needed for successful 21st century careers.

We begin by exploring the influence of technology and media within the 21st century learning process on the new roles of teachers to engage students in the classroom. No longer are teachers and textbooks the sources of all information. Instead, the teacher has become the facilitator of knowledge and skills acquisition. With a few keystrokes, students can explore the world using boundless online resources and a wide array of digital media to obtain the information they seek. Students can discuss their findings in real-time conversations with experts and with other students representing a global array of cultures and experiences.

These exciting innovations provide unlimited ways to expand educational opportunities for our students, but they also present new challenges to teachers. As a teacher, how will you go beyond the textbook? How will you select the "right" technology and media when so many choices are available? And more importantly, how will you create learning experiences that effectively use these tools and resources to ensure that your students gain new knowledge and skills?

Framework for 21st Century Learning: Technology and Media in Today's Schools

As we continue to move forward in the 21st century, it is critical that the foundational components of PK–12 education keep pace with evolving societal needs to prepare students for citizenship and successful careers. As a teacher today, you are challenged to help students achieve mastery of core subjects as well as gain 21st century knowledge and skills. Leaders from business and education, as well as other associations and institutions, are joining together to recommend new approaches and broader learning expectations for PK–12 students (ISTE, 2012; Partnership for 21st Century Learning, 2011). Foundational to 21st century knowledge and skills is the preparation of your students to meaningfully and purposefully use technology and media for creativity and innovation, communication, research, and problem solving. Themes based on global awareness, entrepreneurship, and lifelong learning skills, such as adaptability, leadership, and responsibility, are also recommended for inclusion within core subject area courses. This text will serve as a guide to assist you in integrating 21st century knowledge and skills into your instructional planning and practices.

INSTRUCTIONAL TECHNOLOGY

Currently, when most people hear the word *technology,* they think of products like computers, tablets, and mobile devices. In this text, we will be referring to **instructional technology,** which involves the integration of teacher and student use and knowledge of tools, resources, and techniques to improve student learning.

To promote student learning, you need to create an appropriate learning environment. Throughout the book we will describe the decision-making processes that you can use and the factors you must balance in your decisions. You will need to know the characteristics of your learners. The expected outcomes (objectives) must be specified. You will need to select

the appropriate strategies and materials. The best available technology and media must be used properly to promote optimal learning. You will need to get your learners involved through appropriate practice and feedback. Throughout the process, you will be assessing student learning and evaluating the instructional experience, as well as its components, so you can revise as necessary. We have put all of these steps together in the ASSURE model.

Although some educators view technology as a classroom cure-all, it is important to note that technology resources don't automatically make teachers more capable. You will need to be versed in best practices for integrating technology into the curriculum. The ASSURE model provides a structure and easy-to-follow steps to guide teachers through the process of creating lessons that achieve the goals of effectively using technology. The model is applicable for all types of technology across all subject areas for different learning conditions.

Developed as a planning aid to help ensure that technology and media are used to their maximum advantage, not just as interchangeable substitutes for printed or oral messages, the ASSURE model provides a systematic process for creating learning experiences. Indeed, one of the most important roles of technology and media is to serve as a catalyst for change in the whole instructional environment.

TECHNOLOGY FOR ALL LEARNERS

Introduction

As a result of inclusion, the number of students with disabilities in the general classroom is increasing. Technology plays an important role in the education of students with exceptionalities. Adapted and specially designed technology and media can contribute enormously to effective instruction of all students and can help them achieve at their highest potential regardless of innate abilities.

Children with disabilities in particular need special instructional interventions. Children with mental disabilities have a greater opportunity to learn when presented with highly structured learning situations. Structure compensates for ill-structured prior knowledge that decreases students' abilities to incorporate messages into atypical mental constructs. These students benefit from having much more of the message placed within a familiar context.

Students with hearing or visual impairments require different kinds of learning materials. More emphasis should be placed on audio for students with visual impairments and on visuals for those with hearing problems. Adjusting instruction for all exceptional groups requires heavy reliance on technology and media, as well as the appropriate selection of these materials to fit specific purposes. Many teachers have found that these assistive strategies for students with disabilities have the added benefit of helping all students.

Assistive technologies can be classified as low tech, medium tech, or high tech. Low-tech devices do not use electricity (neither electricity nor batteries). For example, a magnifying glass to enlarge printed material for a visually impaired student would be a low-tech assistive technology. The medium-tech category includes electrical devices. A mini book light to increase illumination would be representative of medium-tech equipment. High-tech assistance involves the use of a computer. The knfb Reader is an example of high-tech assistive technology.

Diverse learners also include gifted and talented students who, for example, could use newspapers, periodicals, DVDs, or archived documents to explore topics beyond or in addition to regular classroom assignments. They can also use the Internet to search for current information or to engage in a live chat with the author of a book the class is reading or a state senator who will vote on an environmental issue being studied. They can be asked to analyze the information they locate and to synthesize a presentation for the class, perhaps using PowerPoint, or they can post their findings on a class webpage.

For more information, see the Technology for All Learners features throughout this book.

A braille display is an example of an assistive technology.

Current technology offers several benefits for teachers. One is the ability to digitally store and access large amounts of information, whether as text, audio, visuals, games, or movies, in computer files, on CDs or DVDs, or in a cloud storage space. Another unique advantage of current technology is its adaptability to meet the varying needs of your students. As seen in the accompanying Technology for All Learners feature, you can differentiate instruction and access to learning experiences with a variety of technology tools. A third advantage of technology is that your students are no longer limited to the confines of the classroom. Through the school media center and computer networks such as the Internet, the world becomes each student's classroom.

Status of the Technology Gap. As you plan different technology integration activities, it is important to stay current on technology issues, such as the "digital divide," that may influence your instructional choices. The digital divide—or technology gap—in PK–12 schools continues to narrow. Students of all economic levels have greater access to high-speed Internet-connected computers at school. The current ratio of about one computer per every three students (Warschauer, 2010) helps bridge the gap for students who may not have home computers.

On the other hand, the technology gap varies when examining Internet usage by adults. Even though in 2011 approximately 80% of American adults used the Internet at home or work, disparities in Internet use still exist based on ethnic groups (Livingston, 2011). For example, 77% of white adults reported using the Internet at home, as compared to 66% of black and 65% of Latino adults. A similar pattern was seen for use of cell phones when focused on voice. Interestingly, the report revealed that nonvoice cell phone use was higher among all groups, with text messaging being the highest nonvoice use of the cell phone among all groups. So, when you are thinking about using the Internet to communicate with your students' families, remember that not all of them will have access to your webpages or emails.

Media Formats. **Media,** the plural of *medium,* are means of communication. Derived from the Latin *medium* ("between"), the term refers to anything that carries information between a source and a receiver. The purpose of media is to facilitate communication and learning.

Media are discussed in more detail in later chapters, but as an overview, let's look at the six basic types of media used in learning (Figure 1.1): text, audio, visuals, video, manipulatives (objects), and people. Text, the most commonly used medium, is composed of alphanumeric characters that may be displayed in any format—book, poster, whiteboard, computer screen, and so on. Audio, another medium commonly used in learning, includes anything you can hear—a person's voice, music, mechanical sounds (running car engine), noise, and so on. It may be live or recorded. Visuals are also regularly used to promote learning and include diagrams on a computer screen, drawings on a whiteboard, photographs, graphics in a book, cartoons, and so on. Video is a visual as well as audio medium that shows motion and can be stored on DVDs, streamed from the Internet, be in the form of computer animation, and so on. Although often not considered media, real objects and models are three-dimensional manipulatives that can be touched and handled by students. The sixth and final category of media is people. In fact, people are critical to learning. Students learn from teachers, other students, and adults.

There are many types of media in each category, which we will refer to as **media formats**—the physical forms in which messages are incorporated and displayed. Media formats include, for example, whiteboards and webpages (text and visuals), PowerPoint or Prezi slides (text and visuals), CDs (voice and music), DVDs (video and audio), and computer multimedia (audio, text, and video). Each has different strengths and limitations in terms of the types of messages that can be recorded and displayed. Choosing a media format can be a complex task, considering the vast array of media and technology available, the variety of learners, and the many objectives to be pursued (Table 1.1). When selecting media formats,

FIGURE 1.1 Six Basic Categories of Media

the instructional situation or setting (e.g., large group, small group, or self-instruction), learner variables (e.g., reader, nonreader, or auditory preference), and the nature of the objective (e.g., cognitive, affective, motor skill, or interpersonal) must be considered, as well as the presentational capabilities of each of the media formats (e.g., still visuals, video, printed words, or spoken words).

INSTRUCTIONAL MATERIALS

Once you determine the media format, such as a DVD, you must decide which of the appropriate DVDs you will use. The specific DVD becomes the instructional material.

TABLE 1.1 Examples of Media Formats and Instructional Materials		
Media	**Media Formats**	**Instructional Materials Examples**
Text	Printed book, computer software, e-book, webpages	A textbook StoryMaker software
Audio	CD, live presenter, podcast	State of the Union address on webcast
Visual	Drawing on interactive whiteboard Photo in a newspaper	Drawing of the musical scale Photo of local building
Video	DVD, IMAX documentary film, streamed video	*Lewis & Clark: Great Journey West* video
Manipulative	Real or virtual object	Algebra tiles
People	Teachers, subject-matter expert	The chief officer of NASA

Instructional materials are the specific items used within a lesson that influence student learning. For example, a middle school lesson may focus on adding polynomials with a computer software program that provides virtual manipulatives students use to create "concrete" examples of addition problems in order to reach solutions. The computer software offers feedback and opportunities to continue practicing. The specific math problems and feedback generated by this software are the instructional materials. Another example is this text that you are currently reading, which consists of the written information (text), visuals, and learning exercises found at the end of the chapter.

The design and use of instructional materials are critical, because it is the interaction of the students with those materials that generates and reinforces actual learning. If the materials are weak, improperly structured, or poorly sequenced, only limited learning will occur. On the other hand, powerful, well-designed instructional materials are experienced in such a way that they can be readily encoded, retained, recalled, and used in a variety of ways. Learners will remember these materials if they are created, integrated, and presented in a manner that allows them to have the needed impact.

Students can be actively involved individually, in small groups, or with a teacher.

ROLES OF TECHNOLOGY AND MEDIA IN LEARNING

Jonathan Bergmann and Aaron Sams (2012) coined the phase "the flipped classroom" to describe a model of instruction that mixes direct instruction with constructivist learning experiences. The idea merges technology-based instructional opportunities with teacher-guided learning. Students are able to gather information through video, online exploration, and audio formats outside the instructional setting that they then use in the classroom to extend their understanding of content with the teacher's guidance.

Technology and media play an important role in these types of learning experiences, either when you create them for your students to use or when your students explore new learning opportunities. The model provides you with the opportunity to bring technology more naturally into your classrooms and to explore more creative ways to engage your students in learning (Hertz, 2012).

The 21st Century Teacher

When instruction is teacher centered, technology and media are used to support the presentation of instruction. For example, you may use an electronic whiteboard to display variations of a bar graph as your students predict population growth over time. You may also use a pocket chart to show how the meaning of a sentence changes when word cards are rearranged. Projecting a live video feed from a zoo can facilitate a presentation on the feeding habits of birds. Certainly, properly designed instructional materials can enhance and promote learning. This book uses the ASSURE model to assist you in selecting and using instructional strategies, media, technology, and materials. However, the effectiveness of your choices depends on careful planning and selection of the appropriate resources, as seen in the next section.

THE DIGITAL TEACHER

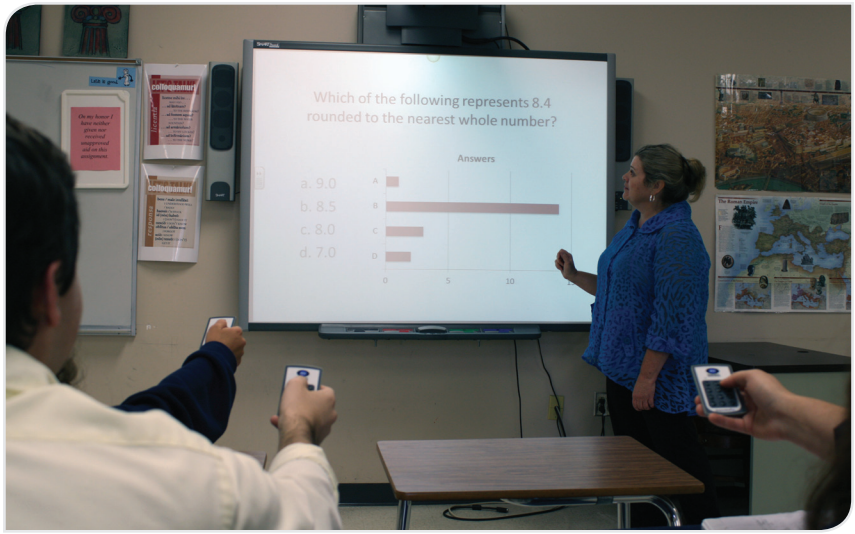
Digital tools expand and enhance your capabilities to fulfill the numerous roles and responsibilities associated with being an educator. These tools better enable the "digital" teacher to plan for and provide interactive instruction while participating in a global community of practice with fellow educators. The following examples show the potential available in a well-equipped digital environment.

Interactive Instruction. A "digital" teacher's instruction includes presentations that are media rich and interactive. Live digital videoconferences bring historians, novelists, and content experts into your classroom. Notes and concept maps from brainstorming sessions are captured on electronic whiteboards and instantaneously emailed to your students. Instructional presentations seamlessly integrate streamed digital video and audio from Internet-based files that range from short clips demonstrating specific concepts to full-length documentaries. You instantaneously go to a specific section of a DVD and show a segment in slow or fast motion or as a still image to reinforce targeted outcomes for your students. PowerPoint or Prezi presentations integrate animations, sounds, and hyperlinks with digitized information.

Personal Response Systems (PRS). Digital teachers use handheld digital devices, such as **personal response systems** (PRS), to collect and graphically display student answers to teacher questions. The PRS, commonly called a "clicker," is a wireless keypad similar to a TV remote that transmits student responses. Because each PRS is assigned to a designated student, the PRS system can be used to take attendance. However, its main benefit is to allow you to know each of your student's responses in a variety of circumstances. Using PRS during instruction enhances learner–instructor interactivity in whole-class settings, which has been shown to produce better learning outcomes (Flynn & Russell, 2008). Educational uses of the PRS include measuring student understanding of concepts, comparing student attitudes about different ideas, predicting "What if" situations, and facilitating drill and practice of basic skills. The PRS graphs student responses to provide teachers and students immediate feedback. Teachers can use this information to guide the pace and direction of a discussion and to make instructional decisions to meet student learning needs.

Teachers can use technology to help students understand concepts.

Mobile Assessment Tools. Mobile computing resources enable teachers to record student assessment data directly into a mobile device that transfers the data to a computer for report generation. For example, mobile digital devices



Personal response systems provide teachers with immediate feedback from students.

are used to create running records of primary student reading ability or student performance data observed in presentations, lab experiments, or handwriting (Weinstein, 2005).

Elementary teachers are fast becoming large-scale users of mobile assessment tools to monitor and record the reading abilities of their students. Many use mCLASS: Reading by Wireless Generation, software that provides the text of a book the student is reading and a series of tools to let the teacher easily track performance while the student reads the book. The software also offers digital versions of leading reading assessment instruments, such as Dynamic Indicators of Basic Early Literacy Skills (DIBELS).

The mobile devices not only save you time, but the software also provides automatic timing and scoring of your student results. You can continually individualize instruction because of the availability of immediate results. Assessment data are easily downloaded to a secure, password-protected website that offers a variety of reporting options, from whole class to individual student.

Mobile devices allow you to gather information directly from your students. Ms. Unger, a fourth grade teacher, uses Quick Response (QR) Codes to gather information about her students as they enter her classroom every morning. She assigns her students homework that is a summary of what they learned and how they are feeling about school which they then transmit to her each morning. She uses the QR code system the school district installed as a quick way to gather the information. She scans through the student reports and adjusts her teaching to reflect her students' needs. While the data she gathers is informal, Ms. Unger feels that it helps her to ensure quality learning experiences for all her students.

Special education teachers often use a mobile device equipped with GoObserve software as a mobile assessment tool. The program can be customized to record designated activities in a student's Individual Education Plan. During an observation of your student performance or behavior, you use the stylus to record the observed strategies from a list of possible choices. As a teacher, you also can add written comments and notes to that student's record. After the observation, you can transfer the information to your computer to generate reports and graphs of student progress.

Community of Practice. Digital teachers participate in community of practice (CoP) activities, in which groups of educators with common goals from across the nation and around the world share ideas and resources. These Internet-based interactions allow teachers to collaborate and exchange ideas and materials. The Communities of Practice can include educators who are teaching the same subject area and grade level or educators with similar needs, such as technology integration, classroom management, or working with gifted and talented students.

Teachers interested in integrating technology into their instruction can utilize the resources and networks of experts, mentors, and new colleagues supported by a variety of web communities. An example is **TeacherFocus (www.teacherfocus.com),** a virtual community that offers you the opportunity to work collaboratively with teachers across the country and to learn

about advances in best practice. TeacherFocus offers you topics of interest, event calendars, and focused discussions related to content and grade levels.

As members of the Virtual Math Teams (VMT) project at the Math Forum, math teachers can learn to enhance student use of technology in solving nonroutine, authentic problems requiring pre-algebra, algebra, or geometry knowledge and skills. Through the VMT, middle and high school teachers can work with peers in special Internet chat sessions with shared whiteboard software, which will then be used by their students.

The effective use of technology and media demands that teachers be better organized in advance, first thinking through their objectives, then altering the everyday classroom routine as needed, and finally evaluating to determine the impact of instruction on mental abilities, feelings, values, interpersonal skills, and motor skills. However, the shift to the 21st century and increased access to digital resources will change not only how you function as a teacher, but also student roles, as we discuss next.

NETS FOR TEACHERS

The National Educational Technology Standards for Teachers (NETS-T) provide five basic guidelines for becoming what we call a *digital teacher* (ISTE, 2012b). As seen in Table 1.2, the NETS-T describe classroom practices, lesson development, and professional expectations. Each chapter of this text includes a Professional Development section to help emphasize the importance of the NETS-T and to build your knowledge and skills through Demonstrating Professional Skills and Building My Professional Portfolio activities that are directly associated with NETS-T.

TABLE 1.2 National Educational Technology Standards for Teachers (NETS-T)

Standard	Description
Facilitate and Inspire Student Learning and Creativity	Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.
Design and Develop Digital-Age Learning Experiences and Assessments	Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS-S.
Model Digital-Age Work and Learning	Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.
Promote and Model Digital Citizenship and Responsibility	Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.
Engage in Professional Growth and Leadership	Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources.

Source: Reprinted with permission from *National Educational Technology Standards for Teachers and National Educational Technology Standards for Students*. Copyright (c) 2007, 2008 by ISTE (International Society for Technology in Education.) All rights reserved.

Carefully designed technology can make independent learning more effective.

21st Century Learner

When instruction is student centered, the primary users of technology and media are the students themselves. Student-centered activities allow teachers to spend more of their time assessing and directing student learning, consulting with individual students, and teaching one on one and in small groups. How much time you can spend on such activities will depend on the extent of the instructional role assigned to technology and media. Indeed, under certain circumstances, the entire instructional task can be left to technology and media. In fact, media are often "packaged" for this purpose—objectives are listed, guidance in achieving objectives is given, materials are assembled, and self-evaluation guidelines are provided. This is not to say, of course, that instructional technology can or should replace you as the teacher, but rather that technology and media can help you become a creative manager of the learning experience instead of a mere dispenser of information.

THE DIGITAL STUDENT

Digital students learn in classrooms where the technology is a seamless component of learning that expands the educational environment beyond the classroom walls. Devices and digital connections extend the existing capabilities of learners in many directions.

Interactive Tools. The digital student uses mobile wireless devices in a variety of ways in and out of the school setting by taking technology where it is needed. For example, your students on the reading rug find Internet resources on wireless laptop computers or tablets. Students bring personal mobile devices (smart phones); handheld computers; or "netbooks," smaller and lighter computers, to the library to take notes from archived community newspaper articles. Student pairs use a digital camera to capture examples of symmetry found on the school campus. Elementary students with digital probes record the pH of six soil types used to grow radish plants. A high school student with a reading access barrier listens to an MP3, or compressed audio file, of Michael Chabon's "Inventing Sherlock Holmes," a homework reading assignment for the class (**www.assistivemedia.org**). These wireless devices extend and embellish the learning experience beyond anything nondigital methods can produce.

Students can gather information and study material prior to learning experiences in the "flipped" classroom.

Interacting with Others. Never before have your students been so connected with each other as they are in today's wireless digital environments. Smart phones, tablets, and laptops are used to send video, voice, text, and animated messages; to listen to lessons, music, news, and sports; and to watch the latest music videos and movies. Students communicate with their digital devices through voice commands, written notes, or by using a touchscreen or mini keyboard. Documents with digitally embedded comments and edits are instantaneously exchanged between students and their

teachers, among students, and with experts. Student learning communities extend around the globe through web-based interactive communication tools and social media sites such as **blogs** (publicly accessible personal journals), **wikis** (web information that can be edited by any registered user), and **podcasts** (Internet-distributed multimedia files formatted for direct download to mobile devices). For example, your students can create a blog on global warming in which they regularly exchange commentary and related hyperlinks with students located around the world. Middle school students use wikis to interact with college students who respond to their writing activities, while a high school American literature class uploads podcasts of interviews with authors to the class website.

These tools are becoming increasingly popular, as seen in a 2012 Nielsen report that shows continued increase in the use of technology and in the time spent on social media sites (Nielsen Company, 2012). Wikipedia is similarly popular, with over 3 million entries available in over 200 languages as of March 2013 (**http://en.wikipedia.org**). As with digital teachers, the digital students of today embrace and use technology to explore, inquire, and advance their personal learning, as well as contribute to the knowledge of others.

NETS FOR STUDENTS

The National Educational Technology Standards for Students (NETS-S) provide six critical skills students need to achieve success in school and in future careers (ISTE, 2012a). Notice in Table 1.3 that the NETS-S closely align with 21st century knowledge and skills. Also interesting is the placement of Technology Operations and Concepts as the last standard, a shift from the original arrangement that listed it as the first standard (ISTE, 1998). It is important that as a teacher you are familiar with the NETS-S and build your technology skills to match what is expected of your students. Throughout the text we provide multiple examples of how the NETS-S are integrated into ASSURE lesson plans.

TECHNOLOGY FOR INCLUSION

In today's classrooms, teachers will be working with students who have a variety of learning needs. Many students will have English as their second language. Other students will

TABLE 1.3 National Educational Technology Standards for Students (NETS-S)

Standard	Description
Creativity and Innovation	Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
Communication and Collaboration	Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
Research and Information Fluency	Students apply digital tools to gather, evaluate, and use information.
Critical Thinking, Problem Solving, and Decision Making	Students use critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
Digital Citizenship	Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
Technology Operations and Concepts	Students demonstrate a sound understanding of technology concepts, systems, and operations.

Source: Reprinted with permission from *National Educational Technology Standards for Teachers and National Educational Technology Standards for Students*. Copyright (c) 2007, 2008 by ISTE (International Society for Technology in Education.) All rights reserved.

have learning or physical challenges and will need assistance to be able to participate in classroom activities. Technology can provide the kinds of support these students need to be successful in their learning. Teachers will need to make choices and decisions about using technology to optimize learning for all the students in their classrooms. The ASSURE model can help you make technology decisions as you consider the learning needs of all your students.

Framework for 21st Century Learning Literacies

Classroom experiences must provide multiple opportunities for gaining new knowledge and skills that are encompassed in a critical set of literacies for 21st century learning. This text prepares you to embed key learning technologies that your students need to improve learning and achieve successful careers.

STUDENT OUTCOMES

Teachers need an understanding of the ability of a student to comprehend or decode information and to use, transform, and create new information. As you follow the ASSURE model to develop your lesson plans, always include opportunities for students to build general literacy knowledge and skills.

You will also want to consider the standards for learning and recognize how to support your students' learning experiences so that they can be successful. By recognizing your students as individuals with unique learning needs, you will be able to help them achieve the targeted learning outcomes.

SUPPORT SYSTEMS

As a classroom teacher you are not alone in helping your students achieve designated outcomes. There are many resources available to you, such as media specialists, technology coordinators, and area universities with courses and programs, that can help you gain additional knowledge about technology. Many of these support systems are focused on ensuring student engagement and learning. Their intent is to help you to make appropriate choices to meet your students' learning needs and to ensure you are able to use the resources successfully.

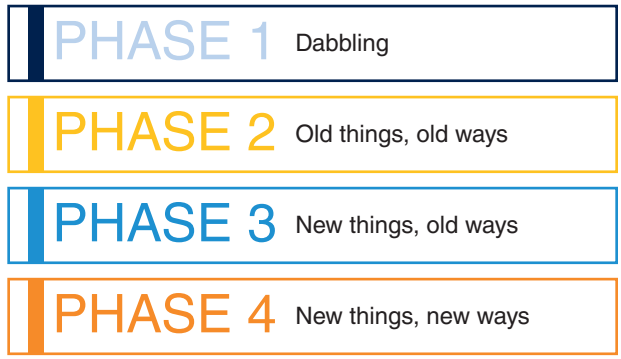
21st Century Learning Environments

The trend for today's teachers is a shift from traditional teaching strategies and tools to digital approaches that better meet the needs of 21st century students. However, the transition from traditional to digital classroom environments varies greatly from teacher to teacher and school to school. Prensky (2006) describes teachers in this variable process of technology adoption and adaptation as moving, whether slowly or quickly, through a four-phase process: (1) dabbling, (2) doing old things in old ways, (3) doing old things in new ways, and (4) doing new things in new ways (p. 43) (see Figure 1.2).

The process begins with Phase 1, "dabbling" with technology by randomly adding technology tools to a few learning situations. In Phase 2, technology is used to do old things in old ways, as when teachers display lecture notes in PowerPoint rather than using overhead transparencies. It is not until Phase 3, doing old things in new ways, that technology begins to shows its promise, such as when a teacher uses a virtual 3-D model to demonstrate the structure

of a compound rather than drawing it on a chalkboard, or students use word processing and clip art rather than notebook paper and hand-drawn images to create a short story. Finally, Phase 4, doing new things in new ways, fully utilizes the power of technology and media, but it requires providing our students with "future-oriented content [to] develop their skills in programming, knowledge filtering, using their connectivity . . . with cutting edge, powerful, miniaturized, customizable, one-to-one technology" (Prensky, 2006, p. 45).

FIGURE 1.2 Prensky's (2006) Technology Adoption and Adaptation Four-Phase Process



THE LEARNING CONTINUUM: TRADITIONAL TO DIGITAL

Many of today's classrooms have achieved Phase 4 by adopting and adapting their environments with digital tools that support and enhance "digital" teacher and student capabilities. For example, technology extends environments beyond the classroom walls by connecting students with other students, outside experts, and parents. Individual classroom websites provide access to homework calendars, assignment details, online resources, and often offer parents access to real-time reports of student progress.

Within these phases, three primary types of instruction are used: face-to-face instruction, distance learning, and blended learning. We have all experienced face-to-face instruction at school, at home, and during extracurricular activities. When done well, it is an excellent method of teaching that is prevalent in PK–12 schools. Distance learning occurs when the teacher and students are not in the same physical location during instruction. In 2011, nearly all of the states offered students options for taking middle or high school online virtual classes (Glass, Welner, & Bathon, 2011). Other schools are offering courses that combine face-to-face instruction with distance learning to create blended instruction, allowing students to see teacher demonstrations and work with other students during hands-on activities, such as labs, drama and musical arts performances, or building 3-D models. Many states are now adding a graduation requirement that all high school graduates must have completed at least one blended or totally online course.

A 21st century classroom representing Phase 4: doing new things in new ways.

THE CHANGING ROLE OF MEDIA CENTERS

Many school libraries have been merged into what are now called **media centers,** which offer traditional library reading resources but now also include a variety of information technology assets. Most media centers are equipped with multiple Internet-connected computers, often with subscriptions to PK–12 online resources such as libraries of digital books, reference materials, and educational software. The media centers also provide you with a variety of classroom support materials ranging from lab kits to subject-specific software and videos. The role of the media specialist is continually expanding to require increasing expertise in accessing the array of digital resources, as well as understanding basic computer technology to assist your students using the equipment in the center.

The Role of Standards

COMMON CORE

The Common Core State Standards (CCSS) were developed over several years with an emphasis on higher-level learning (Calkins, Ehrenworth, & Lehman, 2012; CCSS, 2012). Students are expected to engage in reading and writing as an integral component of their learning within all content areas. The idea is that students can learn to read complex texts and then communicate their understanding of what they have read, whether the text is literature, mathematics, social science, or science. Also valued in the CCSS is the concept that learning is a process; thus, the standards are written so that each grade level's standards reflect what has been learned and what is to follow. Embedded in CCSS is the respect for the teacher's knowledge and skills in working with individual students to facilitate learning. The standards provide teachers with the flexibility to design instruction to meet their students' learning needs and to foster success in all aspects of their learning.

NATIONAL/STATE CURRICULUM STANDARDS

Even though the CCSS have become the focus of much of the implementation of standards throughout the United States, there is still the need to reflect individual learning needs within curricular areas. There are many common core content areas that have standards yet to be developed and some standards that will remain the domain of individual states. The state standards that are used to provide specific guidance for learning, for example, technology, are prominent at national and state levels.

Copyright Concerns: Copyright Law

To protect the financial interests of the creators, producers, and distributors of original works of information and art, nations adopt copyright laws. **Copyright** refers to the legal rights to an original work. These laws set the conditions under which anyone may copy, in whole or part, original works transmittable in any medium. Without copyright laws, writers, artists, and media producers would not receive the compensation they deserve for their creations. The flow of creative work would be reduced to a trickle, and we would all be the losers.

Technology, especially the Internet, has made it much easier to copy from a variety of digital materials—text, visuals, audio, and video. All material on the Internet is copyrighted unless stated otherwise. In 1998, the Conference on Fair Use issued a report (Lehman, 1998) that, despite not being a legal document, provides a consensus view (until tested in a court of law) on use of copyrighted material.

You have a legal and ethical responsibility to serve as a role model for your students; therefore, use all materials in a professional and ethical manner. We also recommend teaching relevant aspects of copyright laws to your students, even very young students. If you are unsure what to do, ask for your school's copyright guidelines. Librarians and media/technology specialists at your school may be able to help you interpret the national guidelines. Ignorance of the law is no excuse!

Please note that the copyright information presented here is *not* legal advice. It is based on what the authors have read in the literature and online. For more information on copyright, refer to the Print Resources at the end of this chapter.

EDUCATORS AND COPYRIGHT LAW

What happens if an educator knowingly and deliberately violates copyright law? The Copyright Act of 1976 contains both criminal and civil sanctions. Possible fines for copyright infringement are from $750 to $30,000 per infringement. If it can be proven that the law was broken by willful intent, the fine may be raised to $150,000. Willful infringement for private or commercial gain carries a possible fine of $250,000 and up to 5 years in prison. Copyright violation is a serious crime.

FAIR USE

Fair use provides an important copyright exception for teachers and students. Small portions of copyrighted works may be used in teaching, if properly cited and noted that they are copyrighted and by whom. Although there are no absolute guidelines for determining what constitutes fair use in an education setting, the law sets forth four basic criteria for determining what is fair use:

- *Purpose and character of the use, including whether such use is for nonprofit educational purposes rather than of a commercial nature*. Using a copyrighted work for an educational objective is more likely to be considered fair use than using it for commercial gain or entertainment.
- *Nature of the copyrighted work*. If the work is for a general readership, such as a magazine or periodical not specifically designed for education, it would tend to support fair use in the classroom. Works of an entertainment nature, such as movies or music, are less likely to be considered fair use. If the work itself is educational in nature, a judgment of fair use may not be supported because of potential impact on sales.
- *Amount and substantiality of the portion used in relation to the copyrighted work as a whole*. Using a smaller amount of the total work is more likely to be considered fair use than using a larger amount.
- *Effect of the use on the potential market for or value of the copyrighted work*. Use that negatively affects potential sales of the original work weighs against fair use.

Until the courts decide otherwise, teachers and media professionals can use the fair use criteria to decide when to copy materials that would otherwise be protected. For example, if the school media center subscribes to a journal or magazine to which you refer students and you make digital slides of several graphics to help students understand an article, this would be fair use based on the following criteria:

- The nature of the work is general, and its audience (and market) is not predominantly the educational community.
- The character of use is nonprofit.
- The amount copied is minimal.
- There is no intent to replace the original, only to make it more useful to students in conjunction with the copyrighted words.

SEEKING PERMISSION TO USE COPYRIGHTED MATERIALS

Aside from staying within the guidelines that limit but recognize our legal right to free use of copyrighted materials, what else can we do to ensure students have access to these materials? We can, obviously, seek permission from copyright owners and, if requested, pay a fee for their

use. Certain requests will ordinarily be granted without payment of fee—transcripts for the blind, for example, or material to be tried out once in an experimental program. Permission is not needed for use of materials in the public domain—materials on which copyright protection has run out or materials produced by federal government employees in the course of their regular work.

In seeking permission to use copyrighted materials, it is generally best to contact the distributor or publisher of the material rather than its creator. Whether or not the creator is the holder of the copyright, the distributor or publisher generally handles permission requests and sets fees. If the address of the publisher is not given on the material, you can usually find it on the Internet.

When seeking permission:

- Be as specific as possible. For printed materials, give the page numbers and exact amount of print material you wish to copy. If possible, send along a photocopy of the material. Fully describe nonprint material. State how you intend to use the material, where you intend to use it, and the number of copies you wish to make.
- Remember that fees for reproduction of copyrighted materials are sometimes negotiable. If the fee is beyond your budget, do not hesitate to ask whether it can be lowered.
- If for any reason you decide not to use the requested material, make this fact known to the publisher or producer. Without this formal notice, it is likely to be assumed that you have in fact used it as requested and you may be charged a fee you do not in fact owe.
- Keep copies of *all* your correspondence and records of *all* other contacts that you make relevant to seeking permission to use copyrighted instructional materials.

Another solution is to obtain "royalty free" collections of media. Many vendors now sell CDs that contain collections of images and sounds that can be used in presentations or other products without payment of royalties. Be sure to read the fine print. What "royalty free" means varies from one collection to the next. In one case, there may be almost no restrictions on the use of the materials; in another, you may not be allowed to use the materials in any kind of electronic product.

TERM OF PROTECTION

The term, or duration, of copyright was changed by the Sonny Bono Copyright Term Extension Act of 1998. For an individual author, the copyright term continues for 70 years after his or her death. If a work is made for hire (i.e., by an employee or by someone commissioned to do the work), the term is 100 years from the year of creation or 75 years from the date of first publication or distribution, whichever comes first. Works copyrighted prior to January 1, 1978, are protected for 28 years and then may have their copyright renewed. The renewal protects them for a term of 75 years after their original copyright date.

CHANGING THE MATERIAL'S FORMAT

Even though you (or your school) have the capability to convert analog materials to a digital format, it is usually a violation of copyright laws and guidelines. The originators of copyrighted material are granted the sole right to make derivatives of their original work. For example, it is illegal to purchase an analog VHS video and convert it to a digital format. Likewise, you cannot convert copyrighted printed materials into a digital format.

Copyright law protects the format in which ideas are expressed (Becker, 2003). Teachers cannot make audio recordings of library books or textbooks for student use. One exception in the law permits the audio recording of books for use by students who are legally blind.

STUDENTS WITH DISABILITIES

For PK–12 students with disabilities, the National Instructional Materials Accessibility Standard (NIMAS) guides the production and electronic distribution of digital versions of textbooks and other instructional materials so they can be more easily converted to accessible formats, including Braille and text-to-speech.

There are many school resources available for students who have physical or learning challenges. With the addition of **Response to Intervention** (RtI), a program of assessment and appropriate instructional assistance in schools, challenged students are recognized earlier and their needs are more quickly met. Often these challenged students who are in the regular classroom setting are provided with technology resources that aid their ability to be successful in the classroom. As a teacher, you need to seek the assistance of school specialists to ensure that your students have access to the appropriate technology for their learning needs.

UNIVERSAL DESIGN

Additional guidelines include the concept of universal design for learning (UDL), which was created to expand learning opportunities for all individuals, especially those with disabilities (Center for Applied Special Technology [CAST], 2013). The UDL framework consists of three primary principles:

- *Multiple means of representation,* to give diverse learners options for acquiring information and knowledge
- *Multiple means of action and expression,* to provide learners options for demonstrating what they know
- *Multiple means of engagement,* to tap into learners' interests, offer appropriate challenges, and increase motivation (CAST, 2013)

Summary

In this chapter you read about the foundations that will be important in your study of technology and media as they affect your students' learning. We presented information about the roles of technology and media in learning from both your perspective as the teacher and your students' perspectives. The idea of using technology as a learning tool prior to participating in classroom activities was introduced. Both you and your students were identified within the context of the 21st century setting. Key 21st century literacies needed to achieve effective learning were introduced, as well as the variety of learning settings now available based on access to technological tools. An overview of copyright was presented, which will be further discussed in later chapters as it relates to specific technology and media.

Professional Development

DEMONSTRATING PROFESSIONAL KNOWLEDGE

1. What are the key components of the framework for 21st century learning?
2. How would you describe the status of the technology use in today's PK–12 schools?
3. What are ways technology and media can be used in learning?
4. What are the six basic categories of media and the key features of each?

5. In what ways are teacher and student uses of technology and media different?
6. Why is it important to consider 21st century learning outcomes?
7. How would you describe the three types of instruction (face to face, distance, and blended) as they relate to the classroom continuum?
8. What are the key concerns regarding copyright law for educational uses?

DEMONSTRATING PROFESSIONAL SKILLS

1. Prepare a 10-minute presentation on your reaction to the framework for 21st century learning (ISTE NETS-T 5.C).
2. Analyze an instructional situation (either real or hypothetical) and identify the standards (Common Core, state, national) being reinforced in the lesson (ISTE NETS-T 2.C).
3. Prepare a concept map that depicts the benefits and concerns of the three types of instruction (face to face, distance, or blended) presented in this chapter (ISTE NETS-T 5.C).
4. Create a one-page guide about copyright that will assist you in following copyright laws for educational uses (ISTE NETS-T 5.C).

BUILDING YOUR PROFESSIONAL PORTFOLIO

- *Enhancing My Portfolio.* Select a technology integration lesson from the Web. After citing the source of the lesson, analyze it according to topics discussed in this chapter. Specifically, take note of how or if the lesson addresses the following: (1) use of technology and media, (2) types of media used, (3) types of learning standards identified, (4) type(s) of instruction, (5) teacher use of technology, (6) student use of technology, and (7) areas where copyright laws will need to be followed. Reflect on this lesson analysis, providing strengths, weaknesses, and recommendations for using technology and media to enhance student learning (ISTE NETS-T 5.C).
- *Reflecting on My Learning.* Reflect on the 21st century knowledge and skills as compared to the knowledge and skills required for your own PK–12 educational experiences. What are the primary differences? What do you see as the greatest benefits and as your most difficult challenges in ensuring that your students build 21st century knowledge and skills (ISTE NETS-T 2.B)?

Suggested Resources

PRINT RESOURCES

Ashburn, E., & Floden, R. (2006). *Meaningful learning using technology: What educators need to know and do.* New York, NY: Teachers College Press.

Becker, G. H. (2003). *Copyright: A guide to information and resources* (3rd ed.). Lake Mary, FL: Gary H. Becker.

Bielfefeld, A., & Cheeseman, L. (2006). *Technology and copyright law: A guidebook for the library, research, and teaching professions* (2nd ed.). New York, NY: Neal-Schuman.

Bottertbush, H. R. (1996). *Copyright in the age of new technology.* Bloomington, IN: Phi Delta Kappa Educational Foundation.

Brooks-Young, S. J. (2009). *Making technology standards work for you* (2nd ed.). Washington, DC: International Society for Technology in Education.

Brown, J. M. (2002). Enhancing on-line learning for individuals with disabilities. *New Directions for Teaching and Learning, 91,* 61–68.

Burke, J. J. (2006). *Library technology companion: A basic guide for library staff* (2nd ed.). New York, NY: Neal-Schuman.

Clyde, W., & Delohery, A. (2005). *Using technology in teaching.* New Haven, CT: Yale University Press.

Cummins, J., Brown, K., & Sayers, D. (2006). *Literacy, technology, and diversity: Teaching for success in changing times.* Boston, MA: Allyn & Bacon.

Lamb, A. (2006). *Building treehouses for learning: Technology in today's classroom* (4th ed.). Emporia, KS: Vision to Action.

Male, M. (2002). *Technology for inclusion: Meeting the special needs of all students* (4th ed.). Boston, MA: Allyn & Bacon.

Scherer, M. J. (2003). *Connecting to learn: Educational and assistive technology for people with disabilities.* Washington, DC: American Psychological Association.

WEB RESOURCES

Edutopia
www.edutopia.org
Edutopia is sponsored by the George Lucas Foundation and provides teachers current and archived access to special reports, blogs, and videos.

eSchool News
www.eschoolnews.com
eSchool News is a convenient way to keep up to date electronically with what is going on in schools.

Sophia
www.sophia.org
Sophia is a source for tutorials, teacher tools, and professional development. The site holds many resources for teachers and students directed at helping students learn.

AECT.org
www.aect.org
AECT Copyright Committee blog disseminates committee presentations, news, and announcements.

Gary Becker's Copyright Information Site
www.beckercopyright.com
Gary Becker's copyright information site provides you with a quick reference to copyright issues.

Fair Use Guidelines for Educational Multimedia
www.uspto.gov/web/offices/dcom/olia/confu/confurep.pdf

Technology, Education, and Copyright Harmonization (TEACH) Act (2002)
http://www.ala.org/ala/issuesadvocacy/copyright/teachact

U. S. Copyright Office
www.copyright.gov The U.S. Copyright Office offers expert and impartial information about copyright law. The website offers a variety of information and services related to the law.