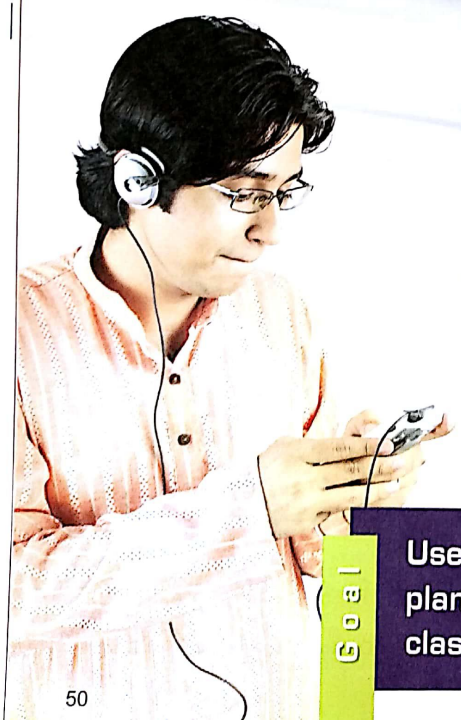
Integrating Technology and Media into Instruction: The ASSURE Model

Knowledge Outcomes

This chapter addresses ISTE NETS-T 2, 4, and 5.

1. State the three primary types of learner analysis criteria and describe the role of the criteria in the systematic planning process for learning.
2. Discuss the rationale and purposes of learning objectives.
3. Write learning objectives that include the audience, behavior, conditions, and degree of mastery.
4. Describe the procedures for selecting, modifying, and designing instructional materials, indicating when each choice is appropriate.
5. Create examples of the five basic steps in utilizing technology, media, and materials.
6. Describe and justify methods for eliciting student participation when using technology and media during instruction.
7. Compare and contrast the techniques for evaluating student achievement, technology, media, strategies, and the instruction.



Goal

Use the ASSURE model to systematically plan lessons that effectively integrate classroom use of technology and media.

ASSURE Classroom Case Study

The ASSURE model is designed to help teachers plan lessons that effectively integrate classroom use of technology and media. To illustrate how to use the six steps of the ASSURE model, we provide a classroom case study of each step after it is described. These steps taken together constitute a sample ASSURE lesson plan that describes the instructional planning of actual classroom teachers.

This ASSURE classroom case study describes the instructional planning used by Tiare Ahu, a high school English teacher who wants to increase student learning and communication skills through the use of electronic portfolios, often referred to as e-portfolios. Tiare feels that her ninth-grade students often lack interest in improving their writing and oral communication skills. Her students typically complete each class assignment without reflecting on past learning experiences—thus inhibiting their ability to grow and improve. She first addresses the concern by having students create paper-based portfolios of their writing. However, it proves difficult for students to revise and improve an existing paper-based assignment and equally difficult to add reflective comments without detracting from the original documents. Her solution is to use e-portfolios that allow students to easily update, modify, and add written or video reflections to their assignments. Throughout the chapter you can follow Tiare's use of the ASSURE model to design a lesson that integrates the use of electronic portfolios.

*To view the **ASSURE Classroom Case Study** Video for this chapter, go to the MyEducationKit for your text and click on the ASSURE Video under Chapter 3 to view the video of Ms. Ahu's ninth-grade English class working on their electronic portfolios.*

INTRODUCTION

Today's teachers have exciting opportunities to go beyond traditional practices through the use of innovative technology and media to prepare students for the 21st century. This chapter introduces you to the ASSURE model, which uses a step-by-step process to create lessons that effectively integrate the use of technology and media to improve student learning. Lessons created with the ASSURE model directly align with the National Education Technology Standards for teachers (International Society for Technology in Education [ISTE], 2008) and students (ISTE, 2007) (hereafter referred to as NETS-T and NETS-S, respectively) as well as curriculum standards from the local to the national level. In addition, the ASSURE model utilizes a standard research-based approach to lesson design that easily aligns with any school or district lesson plan template.

THE ASSURE MODEL

All effective instruction requires careful planning. Teaching with instructional technology and media is certainly no exception. This chapter examines how to plan systematically for the effective use of technology and media. We have constructed a procedural model to which we have given the acronym ASSURE—it is intended to *assure* effective instruction.

Some aspects of teaching and learning have stayed consistent over the years, such as the progressive stages or "events of instruction" that occur (Gagné, 1985). Research has shown that well-designed lessons begin with the arousal of students' interest and then move on to present new material, involve students in practice with feedback, assess their understanding, and provide relevant follow-up activities. The ASSURE model incorporates all these events of instruction.

ANALYZE LEARNERS

The ASSURE model provides you with a systematic approach for analyzing learner characteristics that impact ability to learn. The analysis information is used to plan lessons tailored to meet the needs of your students. The learner analysis examines general characteristics, specific entry competencies, and learning styles.

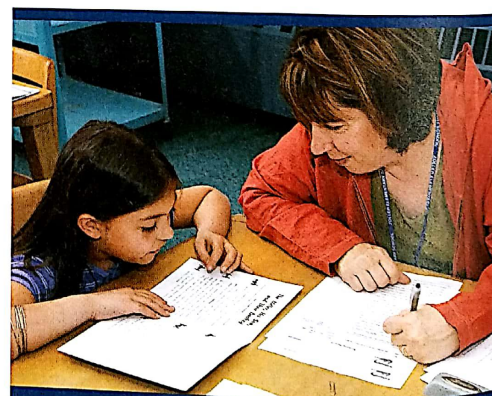
GENERAL CHARACTERISTICS

It is critical to understand the general characteristics that may influence student learning. These characteristics range from constant variables, such as gender and ethnicity, to those that vary on a regular basis, such as attitudes and interest.

Review student records to identify the age differences of your students and better understand behavioral patterns or ability to focus during learning activities. When planning group work, consider gender differences that may impact student attention and willingness to participate. For example, mixed-gender groups may work well in early elementary classes but inhibit student learning for some middle school students. When students represent multiple ethnic groups, select instructional materials and examples that give high priority to cultural identity and values. For example, select photos and clip art with children of the same ethnicity as your students to increase their connection to the lesson topic. Once you have this background understanding, it will be coupled with your observations of student attitudes and interest to design and implement meaningful lessons that address the unique needs of each student.

SPECIFIC ENTRY COMPETENCIES

Recent research reveals that students' prior knowledge of a particular subject influences how and what they learn more than does any psychological trait (Dick, Carey, & Carey, 2009). Therefore, a critical component of designing lessons is to identify the specific entry competencies of your students. You can do this informally (such as in-class questioning) or by more formal means (such as reviewing standardized test results or giving teacher-made tests and assessments). **Entry tests** are assessments that determine whether students possess the necessary **prerequisites,** or competencies, to benefit from instruction. For example, if you are going to teach



Learner analysis often involves testing students individually.
Ellen Senisi

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 the 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, Technology, Media, and Materials

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, technology, and media, and materials to achieve the objectives.

Utilize Technology, Media, and Materials

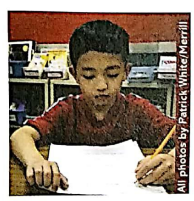
This step involves planning your teaching role for utilizing the technology, media, and materials to help students achieve the learning objectives. To do this, follow the "5 Ps" process: Preview the technology, media, and materials; Prepare the technology, media, and materials; Prepare the environment; 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.



All photos by Patrick Watter/Merrill

Analyze Learners

General Characteristics

Tiare Ahu is teaching the basic ninth-grade English course geared toward the average learner. The students are 14 and 15 years old. Several students have identified learning disabilities, whereas others are above-average readers and writers. Her students come from primarily moderate to low socioeconomic environments and represent an ethnic population common to an urban setting. Generally, the students are well behaved. However, they show lack of interest and apathy toward learning when activities are textbook and paper-and-pencil oriented.

Entry Competencies

The students in general are able to do the following:

- Create and save word-processed documents
- Navigate the Internet
- Create and save digital video
- Respond via written and verbal communication that ranges from below to above grade-level proficiency

Learning Styles

Tiare has found that her students appear to learn best from activities that incorporate technology and media. Using computers provides intrinsic motivation through the creation of personalized work and the careful reflection of learning. Her students vary in their preferred forms of expression: some favor inputting their thoughts as written text, others choose to capture them with digital video, and still others prefer audio recordings. Tiare has also discovered that most of her students have difficulty working in a completely silent atmosphere and therefore allows the option of listening to music on MP3 players when they work on their digital portfolios.

Visit the Chapter 3 section of MyEducationKit to view the video of Ms. Ahu's ninth-grade English class working on their electronic portfolios.

students to calculate the area of geometric shapes, the entry test would focus on multiplication skills to identify students who need remediation prior to the lesson. An important prerequisite skill for many lessons is reading ability. Therefore, you may want to test or arrange to have your students' reading abilities determined.

Once specific entry competencies are identified, list them in your lesson and include entry tests to identify students who need remediation prior to lesson implementation. You may also include a pretest to ensure that students have not already mastered what you plan to teach.

LEARNING STYLES

Learning style refers to the following psychological traits that determine how an individual perceives, interacts with, and responds emotionally to learning environments: multiple intelligences, perceptual preferences and strengths, information processing habits, motivation, and physiological factors.

The information you learn from analyzing the general characteristics, specific entry competencies, and learning styles of your students will guide your decision-making process as you design your ASSURE lesson (see the ASSURE case study for an example of the process).

STATE STANDARDS AND OBJECTIVES

The second step in the ASSURE model is to state the standards and learning objectives for the lesson. What new capability should learners possess at the completion of instruction? The learning objectives are derived from curriculum and technology **standards,** descriptions of expected student performance outcomes established at the school district, state, or national level. As seen in Table 3.1, curriculum and technology standards provide general descriptions of expected student performance, whereas learning objectives, typically written by the teacher or school district, are very specific. It is important to note that a **learning objective** is a statement of what each learner will achieve, not how the lesson will be taught.

IMPORTANCE OF STANDARDS AND OBJECTIVES

Basis for Strategies, Technology, and Media Selection. Why should you state standards and learning objectives? When you have clear statements of what students will know

TABLE 3.1 Going from National Curriculum and Technology Standards to Learning Objectives: PK–4 and 9–12 Examples

National Curriculum Standards	National Technology Standards	Learning Objective Aligned to National Standards
National Center for History in the Schools (NCHS) (see http://nchs.ucla.ed) **K–4 Content Standards:** *Topic 2:* The History of the Students' Own State or Region *Standard 3A:* The student understands the history of indigenous peoples who first lived in his or her state or region. **Grades 3 and 4** Therefore the student is able to compare and contrast how Native American or Hawaiian life today differs from the life of these same groups over 100 years ago.	National Educational Technology Standards for Students (NETS-S) (see www.cnets.iste.org) **Standards:** **1. Creativity and Innovation** Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. **2. 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. **6. Technology Operations and Concepts** Students demonstrate a sound understanding of technology concepts, systems and operations **Grades PK–4** *Performance Indicator 4:* In a collaborative work group, use a variety of technologies to produce a digital presentation or product in a curriculum area. (1,2,6)	Given five different storybooks that describe the lifestyles of Southwest Native Americans over the past 100 years, the third-grade students will create a six-slide PowerPoint presentation for Parent Night that compares and contrasts the housing, diets, traditions, and work of today's Southwest Native Americans with those from 100 years earlier.
National Standards for Arts Education (NSAE) (see http://artsedge.kennedy-center.org/teach/standards.cfm) **Grades 9–12: Visual Arts** *Content Standard: 1:* Understanding and applying media, techniques, and processes *Achievement Standard:* Students conceive and create works of visual art that demonstrate an understanding of how the communication of their ideas relates to the media, techniques, and processes they use.	NETS-S (see www.cnets.iste.org) **Standards:** **1. Creativity and Innovation** Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. **2. 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. **Grades 9–12** Create and publish an online art gallery with examples and commentary that demonstrate an understanding of different historical periods, cultures, and countries. (1,2)	Given a digital camera, computer, and PhotoShop software, the tenth-grade student will (1) create a visual art product that includes at least three digital photos and two descriptive words to represent the concept of freedom, and (2) provide a written rationale that supports their choice of media, techniques, and processes to demonstrate an understanding of freedom.

and be able to do at the conclusion of the lesson, you are better able to carefully select strategies, technology, and media that will ensure learning.

Basis for Assessment. Stating standards and learning objectives also helps ensure accurate assessment of student learning. Explicitly stated student outcomes guide the creation of assessments that measure the targeted knowledge and skills and directly align with required standardized tests.

Basis for Student Learning Expectations. Your students are better able to prepare for and participate in learning

activities when they know the expected outcomes. The learning objectives may be viewed as a type of contract between teacher and learner: "My responsibility as the teacher is to provide learning activities suitable for your attaining the objective. Your responsibility as the learner is to participate conscientiously in those learning activities."

THE ABCDs OF WELL-STATED LEARNING OBJECTIVES

The ABCDs of well-stated objectives provide an easy-to-follow process for writing learning objectives: Specify the Audience for whom the objective is intended, the Behavior to be demonstrated, the Conditions under which the behavior will be observed, and the Degree to which the new knowledge or skill must be mastered.

Audience. Because learning objectives focus on what learners will know and be able to do after the lesson, it is important to clearly identify the targeted learners—for example, "second-grade students." For students you will be teaching all year, you may choose the common audience identifier, "The learner will . . . ," often abbreviated as TLW. For students who have individual education plans, the objectives will be targeted to students by name.

Behavior. The heart of the objective is the verb describing the new capability that learners will have *after* instruction. This verb is stated as an observable behavior, such as *define, categorize,* and *demonstrate.* Vague terms such as *know, understand,* and *appreciate* do not communicate observable performance. The Helpful Hundred list in Table 3.2 offers verbs that highlight performance.

Strive to solicit student behavior or performance that reflects deep understanding and real-world capability. In other words, rather than having students "select the correct answers on a test about water conservation," have them "compare and contrast two water conservation systems to identify which is most eco-friendly." Or rather than selecting names of geometric shapes on a worksheet, have students identify shapes used in the Golden Gate Bridge.

Conditions. Learning objectives should include the conditions under which the performance is to be assessed. In other words, what materials or tools will students be allowed or disallowed for use in demonstrating mastery of the objective? Thus, an objective might state, "Given a list of earthquake occurrences over the past 100 years, the student will generate a line graph to demonstrate trends over time." A language arts objective might say, "Without references, the student will write a 300-word essay on the relationship of nutrition to learning."

Degree. The final requirement of a well-stated objective is the degree of accuracy or proficiency by which minimally acceptable performance will be judged. Certainly students

Table 3.2 The Helpful Hundred

Suggested Performance Terms					
Add	Compute	Draw	Label	Predict	State
Alphabetize	Conduct	Estimate	Locate	Prepare	Subtract
Analyze	Construct	Evaluate	Make	Present	Suggest
Apply	Contrast	Explain	Manipulate	Produce	Swing
Arrange	Convert	Extrapolate	Match	Pronounce	Tabulate
Assemble	Correct	Finish	Measure	Read	Throw
Attend	Cut	Fit	Modify	Reconstruct	Time
Bisect	Deduce	Generate	Multiply	Reduce	Translate
Build	Defend	Graph	Name	Remove	Type
Categorize	Define	Grind	Operate	Revise	Underline
Change	Demonstrate	Hit	Order	Select	Verbalize
Choose	Derive	Hold	Organize	Sketch	Verify
Classify	Describe	Identify	Outline	Solve	Weave
Color	Design	Illustrate	Pack	Sort	Weigh
Compare	Designate	Indicate	Paint	Specify	Write
Complete	Diagram	Install	Plot	Spell	
Compose	Distinguish	Kick	Position	Square	

It is important to let students know the degree to which they should perform.
Stewart Cohen/Stone/Getty

can exceed the stated expectations. A high school chemistry objective may read, "Given six unknown substances and testing equipment, students will identify five of the six unknown substances." When stating the degree or criterion for assessing student products that are more comprehensive in scope, a rubric rating scale is appropriate. For example, the degree of proficiency for a PowerPoint presentation on 18th century monarchies could be stated as follows: "Achieve an overall rubric rating of 3 (on a 4-point scale where 4 = Exceeds Expectations)." Details on creating rubrics are presented in the Evaluate and Revise section of this chapter.

ABCD OBJECTIVES CHECKLIST

Use the ABCD Objectives Checklist (Figure 3.1) to assess the degree to which your objectives communicate the intent of the learning. Further guidelines for writing objectives are discussed in Gronlund's (2009) *Writing Instructional Objectives for Teaching and Assessment.*

ABCD Objectives Checklist

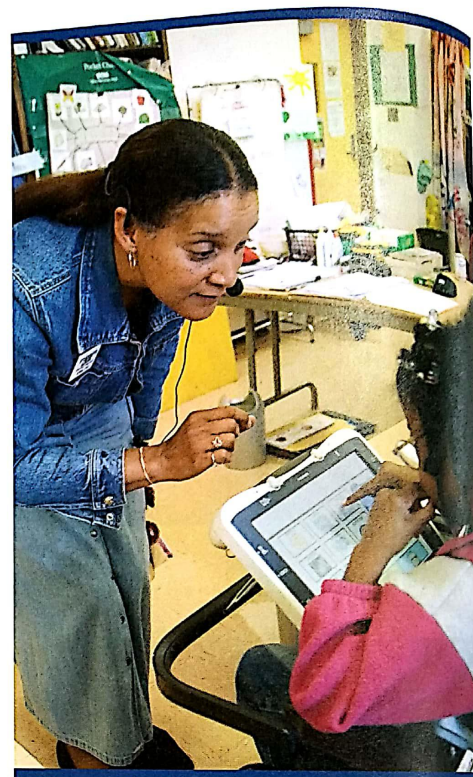
	Appropriately Stated	Partly Stated	Missing
Audience Specifies the learner(s) for whom the objective is intended	☐	☐	☐
Behavior (action verb) Describes the capability expected of the learner following instruction • Stated as a learner performance • Stated as observable behavior • Describes a real-world skill (versus mere test performance)	☐	☐	☐
Conditions (materials and/or environment) Describes the conditions under which the performance is to be demonstrated • Equipment, tools, aids, or references the learner may or may not use • Special environmental conditions in which the learner has to perform	☐	☐	☐
Degree (criterion) States, where applicable, the standard for acceptable performance • Time limit • Range of accuracy • Proportion of correct responses required • Qualitative standards	☐	☐	☐

Figure 3.1
ABCD Objectives Checklist

You will find that learning objectives appearing in curriculum standards, textbooks, online lessons, and other instructional materials are written in a general format that often lacks one or more of the ABCD components. Teachers can modify such objectives to meet the specific learning needs of their students. For example a district standard may state: "The learner will be able to divide fractions." If you have students who struggle with math, you could adapt the objective by adding the following condition: "Given manipulatives, the learner will be able to divide fractions." The same objective for more advanced students would not include manipulatives.

Many curriculum standards also lack the use of technology to assist students in achieving the learning objective. Therefore, you will need to modify standards to add the appropriate NETS for students (NETS-S) (ISTE, 2007) by including technology in the Condition component of the objective, as in the following examples:

- *Given spreadsheet software and data on population growth, natural resources, and global warming,* sixth-grade science students will use a spreadsheet to estimate the impact of population growth on natural resources from at least three perspectives.
- *Given clip art and PowerPoint software,* first-grade students will construct a four-slide presentation with one student-selected clip art image per slide to demonstrate four student moods: happy, sad, angry, and bored.
- *Given access to word processing software and web-based resources on American wars,* American history high school students will generate *a word-processed table* that shows 25 similarities of and differences between World War I and World War II.
- *Given a list of randomly grouped words and Inspiration software,* seventh-grade language arts students will create a concept map that arranges the words into six parts-of-speech groups.



When teaching learners who have disabilities, there may be as many different standards for each objective as there are individuals.

Elizabeth Crews

LEARNING OBJECTIVES AND INDIVIDUAL DIFFERENCES

It is important to adapt learning objectives to the abilities of individual learners. The stated philosophy of most schools is to help students achieve their full potential. In a physical education class with students of mixed ability, for instance, the midsemester goal might be for all students to complete a run of 100 meters, with time standards that vary to show similarity of achievement. For a few, 12 seconds might be attainable; for many others, 16 seconds; and for some, 20 might be realistic. For a student with physical disabilities, it might be a major victory to move 10 meters in 1 minute.

Learning objectives are not intended to limit what students learn, but rather are intended to provide a minimum level of expected achievement. Serendipitous or incidental learning should be expected to occur (and should be encouraged) because learning takes different forms with different students. Class discussions and other kinds of student involvement in the instructional situation, therefore, should rarely be rigidly limited to a specific objective. Indeed, to foster incidental learning and provide for individual differences, it is sometimes advisable to have students specify some of their own learning objectives. (See a set of standards and learning objectives in the ASSURE case study.)

State Standards and Objectives

Standards

- Curriculum—National Council of Teachers of English Standard 4: Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
- Technology—National Educational Technology Standards for Students 3 (Technology Productivity Tools): students use technology tools to enhance learning, increase productivity, and promote creativity.

Objectives for Lesson

1. Given the following questions, the ninth-grade English student will demonstrate the ability to express reflective thinking by answering the following questions in a written or video reflection that meets the "Final Year Reflections" criteria listed on the assignment sheet.
   - "What did I learn about myself, reading, writing, learning, and overall during the past year?"
   - "What do I hope to accomplish in these areas next year when I am a sophomore?"
2. Using DreamWeaver software, the ninth-grade English student will create a new page titled "Final Year Reflections" that meets the formatting criteria for being included in the electronic portfolio Reflections folder.
3. Using files of previously completed work, the ninth-grade student will be able to add the written reflection or upload a video reflection in an accessible format to the "Final Year Reflections" page in the electronic portfolio folder.

Tiare Ahu discusses the curriculum and technology standards and objectives for the ninth-grade English lesson that was videotaped for Chapter 3. Visit the Chapter 3 section of MyEducationKit to view the video of Ms. Ahu's ninth-grade English class.

Select Strategies, Technology, Media, and Materials

The next step in creating effective lessons that support learning through the appropriate use of technology and media is the systematic selection of instructional strategies, technology and media, and lesson materials. The following guidelines discuss the selection process.

SELECTING STRATEGIES

When identifying instructional strategies for a lesson, first consider where teacher-centered approaches should be used and where student-centered strategies might be better. The teacher strategies involve your own teaching activities, as when you present a concept by showing a video or reading a story or when you use the interactive whiteboard to demonstrate how to conjugate a verb. The student-centered strategies are those that engage students in active learning, such as discussing the pros and cons of a topic, conducting an Internet search, taking digital photos of a process, or listening to podcasts on a current topic. Most lessons include several teacher and student strategies.

Wagner (2008) suggests ways to align strategies that involve student use of cyberlearning tools with NETS-S and 21st century knowledge and skills—for example, engaging students in accessing and analyzing information through critical thinking and problem solving, collaborating and communicating with others within and beyond the classroom, and learning to be adaptable as well as creative and imaginative.

The primary consideration when selecting instructional strategies is that they result in student achievement of the standards and objectives. Also, keep students' learning styles and motivation in mind as you select strategies to better ensure meeting the diverse needs of students. Review the ARCS model to see if your strategies will gain student Attention, be Relevant to their needs, require an appropriate level of accomplishment to build their Confidence, and provide Satisfaction for what they learn.

SELECTING TECHNOLOGY AND MEDIA

Selecting appropriate technology and media can be a complex task—considering the vast array of available resources,

the diversity of your learners, and the specific learning objectives to be pursued. Videos, for example, raise the issue of presentation pace, which would be less relevant for a digital presentation that supports easier navigation to key content. In examining educational games, look for relevant practice and remedial feedback. When selecting an audio storybook, look for functions such as embedded definitions and ease of returning to reread sections. To help with this process, see the Selection Rubrics for technology and media in MyEducationKit.

Selection Rubrics. The Selection Rubrics provide a systematic procedure for judging the qualities of specific technology and media. Each rubric includes a set of consistent selection criteria (as shown here) as well as criteria for the designated technology or media (e.g., computer software, audio). You need to decide which criteria are most important for your students' achieving the stated learning objectives.

SELECTION RUBRIC CRITERIA

- Alignment with standards, outcomes, and objectives
- Accurate and current information
- Age-appropriate language
- Interest level and engagement
- Technical quality
- Ease of use (for student or teacher)
- Bias free
- User guide and directions

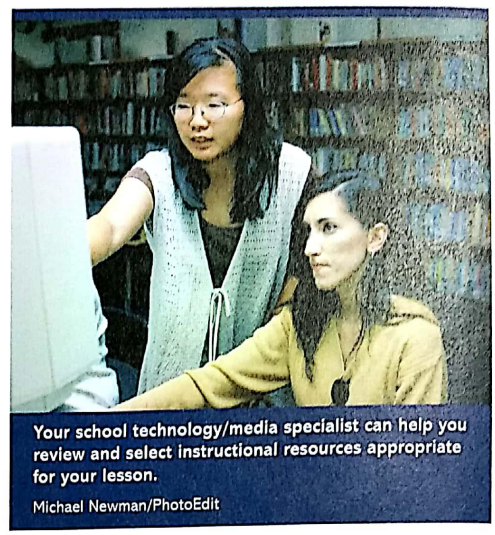
The Selection Rubrics are templates with separate fields to enter the media title, source, and a brief description along with a predefined rating scale to assess the technology/media being reviewed. Go to MyEducationKit to access the Selection Rubrics for this text.

SELECTING, MODIFYING, OR DESIGNING MATERIALS

When you have selected your strategies and the type of technology and media needed for your lesson, you are ready to select the materials to support lesson implementation. This step involves three general options: (1) selecting available materials, (2) modifying existing materials, or (3) designing new materials.

Selecting Available Materials. The majority of instructional materials used by teachers are "off the shelf"—that is, ready made and available from school, district, or other easily accessible sources. Many of these resources are free or inexpensive. Among many offerings, how do you go about making appropriate choices from available materials?

Involving the Technology/Media Specialist. You may want to begin by meeting with your technology/media specialist and discussing your learning objectives, instructional strategies, and desired media format(s). As the specialist gains a better idea of your needs, arrangements can be made to check out the appropriate materials from your school's library/media center or other media collections (public, academic, or regional).



Your school technology/media specialist can help you review and select instructional resources appropriate for your lesson.

Michael Newman/PhotoEdit

Joining Other Teachers. Because evaluation of materials is time-consuming and complex, it may be useful to involve other teachers, especially experienced teachers, whose years of work with media and material alternatives have involved a lot of critical analysis about education resources. Working with other teachers allows a pool of shared ideas for using materials and a collective strength that may make it easier to acquire materials from museums or organizations.

Surveying Media Resource Guides. Online or paper-based media resource guides survey and review free and inexpensive materials. For example, the Gateway to Educational Materials (GEM) database (www.thegateway.org) contains more than 40,000 education resources such as lesson plans, thematic units, and student materials. Sponsored by the National Education Association, GEM draws from some of the country's best museums, universities, and government programs, including NASA, the Smithsonian Institution in Washington, DC, the National Science Foundation, and the Exploratorium in San Francisco. You can search the GEM database by subject area, grade level, and key word. GEM requires each resource to be reviewed and

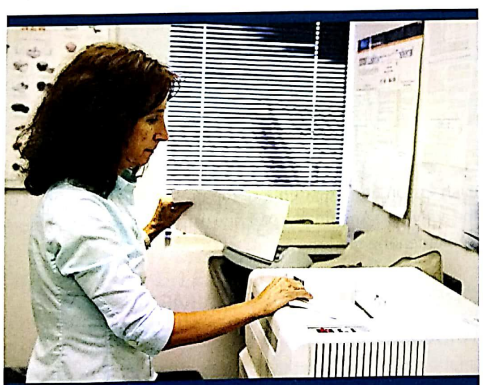
meet specified standards before being added to the collection. Kathy Schrock's Guide for Educators includes links to numerous resource directories, grouped in three categories: back to school, general education, and early childhood. Also included are links to recommended print titles for technology infusion, gadgets, how-to, HTML-Internet, general teaching, Second Life, and Web 2.0 (http://school.discoveryeducation.com/schrockguide/edres.html).

Modifying Existing Materials. As you strive to meet the diverse needs of your students, you will find that "off-the-shelf" materials often need modifications to more closely align with your learning objectives. Technology provides several options for modifying existing materials.

Encouragingly, many educational resources are provided as copyright-free digital files or as paper copies. Digital materials are typically found on educational websites that provide downloadable resources. Example resources include lesson handouts, teacher PowerPoint presentations, and Excel spreadsheets formatted for easy data entry.

However, when materials are only available in PDF or paper format, modifications can be accomplished with digital scanning or creative use of a copy machine. For example, materials can be scanned and modified with editing software. Another approach is to modify a paper original and then make copies of the revised resource. For instance, if you want students to label 20 grasshopper features but have a handout based on 50, you can carefully cover the 30 unwanted features and then make copies.

A word of caution about using and modifying commercially produced materials is to be sure not to violate copyright laws and restrictions. If in doubt, check with your school media specialist, administrator, or legal adviser.



Scanners and photocopiers can be used to copy modified instructional materials.
David Young-Wolff/PhotoEdit

Designing New Materials. When ready-made materials are not available or existing materials cannot be easily modified, you need to design your own lesson materials, which can range from hand printing a flip chart to using your computer to create handouts, presentations, or an online WebQuest. Remember to keep learner needs and learning objectives as the key considerations when designing your lesson materials (as in the ASSURE case study on the next page).

UTILIZE TECHNOLOGY, MEDIA, AND MATERIALS

This step involves planning your role for utilizing the technology, media, and materials. Follow the "5 Ps" process: Preview and Prepare the technology, media, and materials; Prepare the environment; Prepare the learners; and Provide the learning experience.

PREVIEW THE TECHNOLOGY, MEDIA, AND MATERIALS

During the selection process you identified technology, media, and materials that are appropriate for your learners. At this stage you need to preview the selected technology and media in relation to the learning objectives. The goal is to select the portions that directly align with your lesson. For example, if your lesson is on correct use of prepositions, preview several language arts software programs to find drill-and-practice activities that match your objectives. Then design your lesson to include just the preposition sections of the software rather than the entire sequence. Similarly, if using a video documentary, identify the segments that directly align with your lesson, remembering that a DVD allows easy navigation to targeted segments.

Although your decision may have already involved published reviews, distributor's blurbs, and colleagues' appraisals, you should *insist* on previewing the materials yourself before using them. Not only will a thorough review enable you to use resources to their full potential, it will ensure that students are not exposed to inappropriate content or language found in some computer games, videos, and online or printed periodicals.

Select Strategies, Technology, Media, and Materials

Select Strategies

Tiare Ahu selects teacher- and student-centered strategies for the electronic portfolio lesson. Teacher-centered strategies are chosen for reviewing the overall goals of using an electronic portfolio and to introduce student guidelines for completing the final reflections. The student-centered strategies are used for students' written or video reflections of their learning that are added to electronic portfolios. Tiare addresses student motivation by using the ARCS model (Keller, 1988) to consider how electronic portfolios gain student Attention. To achieve Relevance, students reflect on their personal growth over the year and set goals for next year. Their Confidence is reinforced by the lesson's use of skills previously mastered in other electronic portfolio activities. Students gain Satisfaction through personalizing their reflections with digital media such as colors, clip art, and photos.

Select Technology and Media

This lesson involves the continued use of Blackboard course management software and DreamWeaver software to create the web-based portfolios. The lesson also calls for a digital video camera to record student reflections and the use of iMovie to edit the video reflections. The following guidelines help Tiare assess the appropriateness of her technology and media selections:

- *Alignment with standards, outcomes, and objectives.* The software provides the necessary tools for her students to meet the learning objectives.
- *Accurate and current information.* Not applicable for the chosen technology and media.
- *Age-appropriate language.* The software applications are written at a level appropriate for ninth-grade students.
- *Interest level and engagement.* The software applications provide features that enable the students to personalize their electronic portfolios.
- *Technical quality.* The software applications have superior technical quality.
- *Ease of use.* The applications require initial training and periodic review of functions for students to easily use the features.
- *Bias free.* The software applications are bias free.
- *User guide and directions.* The online help features of the software are moderately easy to use. Students most frequently ask each other, the teacher, or the technology assistant for help with technical difficulties.

Select Materials

The materials for this lesson include a teacher-produced student assignment sheet that explains the details of creating and adding the final reflections to the electronic portfolio. Ms. Ahu was not able to use available materials or modify existing materials because the assignment sheet requires details very specific to the lesson.

To view the strategies, technology, media, and materials that Tiare Ahu used in her ninth-grade English class, visit the Chapter 3 section of MyEducationKit to view the video of Ms. Ahu's ninth-grade English class.

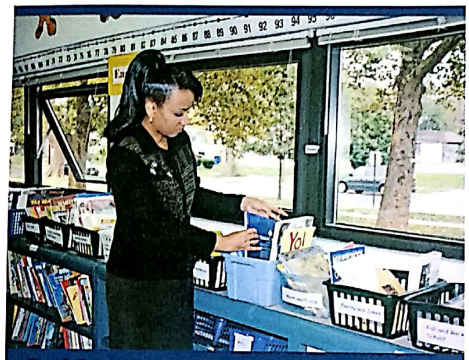
PREPARE THE TECHNOLOGY, MEDIA, AND MATERIALS

Next, you need to prepare the technology, media, and materials that will support your instructional activities. The first step is to gather all the equipment you will need. Determine the sequence for using the materials and what you will do with each one. For example, you may want to change how an instructional game is used by preparing a new set of questions at a different level of difficulty or even on a new topic. Or if the audio portion of a video doesn't align with the needs of your students, you can turn off the sound and provide the narration yourself.

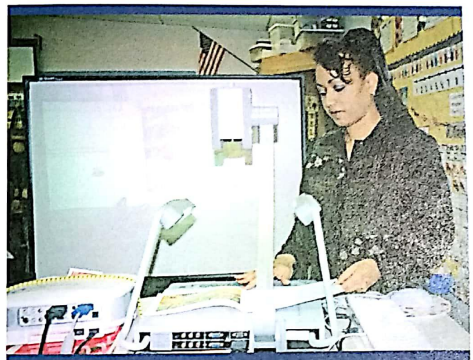
Keep a list of the materials and equipment needed for each lesson and an outline of the presentation sequence of the activities. And finally, practice using the resources before implementing the lesson.

PREPARE THE ENVIRONMENT

Wherever the learning is to take place—in the classroom, in a laboratory, at the media center—the facilities will have to be arranged for effective use of the technology, media, and materials. Some media require a darkened room, a convenient power source, and access to light switches. You should check that the equipment is in working order. Arrange the

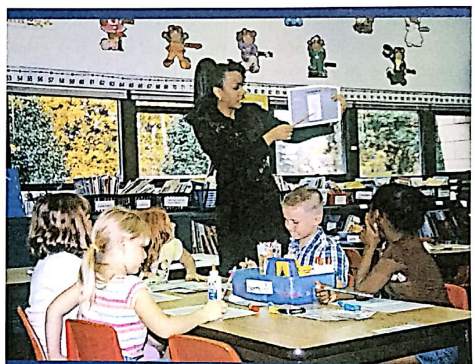


Carefully preview multiple technology, media, and materials when planning your lesson.
Lori Whitley/Merrill



Prepare the environment by arranging the facilities to ensure proper use of technology, media, and materials.
Lori Whitley/Merrill

Prepare the technology, media, and materials to support attainment of lesson objectives.
Valerie Schultz/Merrill



Carefully prepare learners to fully participate in the lesson activities.
Lori Whitley/Merrill

facilities so that all students can see and hear properly. Arrange the seating so students can see and hear each other when cooperative learning is included.

PREPARE THE LEARNERS

Research on learning tells us that what is learned from an activity depends highly on how learners are prepared for the lesson (Gagné, Briggs, & Wager, 1992). We know that in show business entertainers are passionate about having the audience properly warmed up. Effective instruction also requires a proper warmup, which can include one or more of the following:

- An introduction giving a broad overview of the lesson content
- A rationale telling how the content relates to real-world applications
- A motivating statement that creates a need to know the content
- Cues directing attention to specific aspects of the lesson

In most cases you will also want to inform students of the learning objectives, introduce unfamiliar vocabulary, and review prerequisite skills needed for the lesson, including any new skills needed to use technology and media.

PROVIDE THE LEARNING EXPERIENCE

Now you are ready to provide the instructional experience. A teacher-centered learning experience often involves a presentation, demonstration, drill-and-practice, or a tutorial. In using presentation as a strategy, it is important to follow the presentation skills guidelines in the accompanying box, Using Presentation Skills in the Classroom. (See the ASSURE case study presented later in this chapter for Tiare Ahu's approach to the Utilize Technology, Media, and Materials stage.)

USING Presentation Skills in the Classroom

Planning

- *Analyze your learners.* What are the needs, values, backgrounds, knowledge levels, and misconceptions of your learners with regard to the topic you will be presenting?
- *Specify the learning objectives.* What should students do? How much time do you have to present? Limit the objectives and content to the time available.
- *Specify benefits and rationale.* Why is this presentation important for your students? If you cannot answer this question, the focus should be altered to meet student needs.
- *Identify the key points.* Brainstorm the main ideas. Put them on note cards or sticky notes. Most presentations will have from five to nine main points.
- *Identify the subpoints and supporting details.* Again use note cards or stick-on notes. Try to limit yourself to five to nine subpoints for each main point.
- *Organize presentation in a logical order.* The following is an example of a simple organizing strategy.
  1. Overview: Tell them what you are going to tell them.
  2. Present: Tell them.
  3. Review: Tell them what you told them.

Rehearsing

- Use key words from your presentation rather than a script so that you are speaking and not reading.
- Mentally run through the presentation to review each idea in sequence.
- Do a standup rehearsal in the room where you will be presenting or one similar to it.
- Practice answers to questions you anticipate from learners.
- Videotape your presentation or ask a colleague to listen and provide feedback.

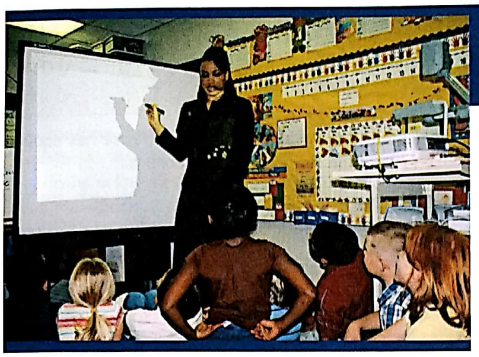
Setting Up

- Check room arrangements and ensure the equipment is in place and operational.
- For computer or video projection, place the screen front and center (Figure A).

A.

- Place the overhead screen or flip chart at a 45-degree angle near the corner of the room. Place the overhead screen to your right and the flip chart to the left if you are right-handed. Reverse the positions if you are left-handed (Figure B).

B.



When providing the learning experience, remember that both teacher-centered and student-centered activities may be utilized.
Lori Whitley/Merrill

- Position objects being studied front and center. Remove them when they are no longer being studied.

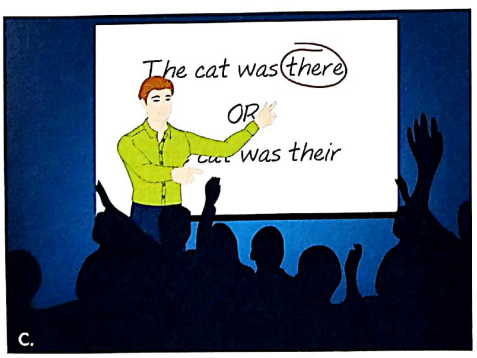
Presenting

Anxiety

- Nervousness and excitement are normal before and during a presentation when you are a new teacher or presenting new content.
- Proper planning and preparation should reduce your anxiety.
- Harness your nervous energy and use it positively with body movement, supporting gestures, and voice projection.
- Breathe slowly and deeply. Your cardiovascular system will slow down and ease the symptoms of anxiety.

Delivery

- Stand up when presenting to command more attention.
- Face the learners to maintain eye contact and allow them to see your facial expressions.
- When using whiteboards, complete your writing, then turn and talk (Figure C).



C.

- Step to the side or in front of your desk to establish more personal contact with the learners. It allows you to be seen and to seem more natural.
- Move while you speak. Teachers who stand in one spot and never gesture can easily lose student attention. Move and gesture, but don't overdo it.
- Use natural gestures. Learn to gesture in front of a class as you would if you were having an animated conversation with a friend.
- Don't put your hands in your pockets. Don't clasp your hands behind your back. Don't wring your hands nervously. Don't play with a pen or other object.

Voice

- Use a natural, conversational style. Relate to your learners in a direct and personal manner.
- Don't read your presentation. If part of your presentation is just information transfer, give the students a copy and let them read it.
- Use a comfortable pace suited to learner needs and the complexity of the content.
- Speak clearly and loud enough to be heard in the back of the room. If you are uncertain about your volume, ask students in the back if they can hear you.
- A pause (silence) after a key point is an excellent way to emphasize it. The more important the idea, the more important it is for you to pause and let the words sink in before going on to the next idea.

Eye Contact

- Maintain eye contact with your learners. Eye contact will make your presentation more like a one-on-one conversation.
- An excellent way to keep your learners' attention is to look eye to eye at each person for at least 3 seconds. Don't quickly scan the learners or look at the back wall, screen, or notes for long periods of time.

Utilize Technology, Media, and Materials

Preview the Technology, Media, and Materials

Tiare Ahu previews the site map and selection properties of DreamWeaver and how to use the digital video camera and iMovie software.

Prepare the Technology, Media, and Materials

Tiare creates a handout that explains what students should do to complete their "Final Year Reflections" in written or video formats. She also adds a "Final Year Reflection" to her sample electronic portfolio.

Prepare the Environment

The lesson will take place in the computer lab and in the video recording studio. Each computer in the computer lab needs to be checked to ensure that DreamWeaver and iMovie software are functional and that all computers can save to the server and print. The studio needs to be arranged for recording student video reflections by setting up the tripod for the digital video camera and arranging the seating in a location with an appropriate background. Tiare also needs to check that the digital media storage device has enough space to store the student video reflections.

Prepare the Learners

To prepare the students, Ms. Ahu introduces the lesson and reviews the learning objectives. Each student receives a handout about completing the "Final Year Reflection" for their electronic portfolio. In addition, the handout also includes the evaluation criteria for the reflection.

Provide the Learning Experience

Ms. Ahu guides student learning by reviewing how to add reflections to their electronic portfolios and by monitoring students as they create their written or video work.

To see how Tiare Ahu utilizes technology, media, and materials for the e-portfolio lesson, visit the Chapter 3 section of MyEducationKit to view the video of Ms. Ahu's ninth-grade English class.

Require Learner Participation

As predicted by Bloom, Engelhart, Furst, Hill, and Krathwohl (1956) over 50 years ago, today's global economy will require students to have experience and **practice** applying, analyzing, synthesizing, and evaluating rather than just knowing and comprehending information. This follows constructivist views that learning is an active mental process built from relevant authentic experiences for which students receive informative **feedback,** a response that lets them know the degree to which they have achieved the objective and how to improve their performance. The NETS for Students (NETS-S) support this level of student participation through the use of a variety of technology and media (ISTE, 2007).

PRACTICE

The objectives for your lesson explicitly state what students are expected to do after instruction. Thus, it is critical to require learner participation through explicit practice with the new knowledge and skills. Four of the six NETS-S have direct applicability when planning student participation activities, in which students use a variety of technology tools for productivity, communication, research, and problem solving or decision making.

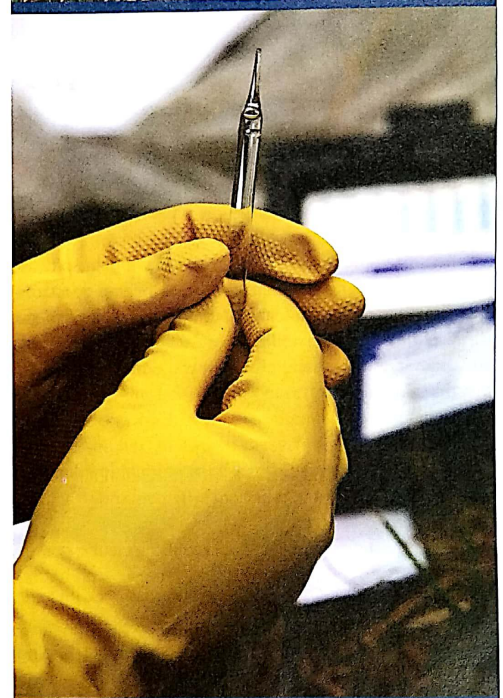
Technology as a Productivity Tool. One common way of requiring learner participation is through the use of productivity tools. For example, in early childhood experiences learning vocabulary words, word meanings can be enhanced when students use KidPix to find images representing new words and then must explain their choices. Another example involves middle school students creating PowerPoint presentations depicting trends in American folk music over the past 100 years. The activity requires summarizing key ideas from historical documents, choosing the best photos and sound clips, and sequencing content in a meaningful way. At the high school level, social studies students can use spreadsheets to examine national population trends and make growth predictions for the next 50 years.

Technology as a Communication Tool. The NETS-S consider how students can 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" (NETS-S 2) (ISTE, 2007). For example, when using projected still pictures of students living in Alaska, you can engage students in a lively discussion in which they compare themselves with the students in the photos. Students can then exchange emails with Alaskan students to gain firsthand knowledge of life in Alaska. As another example, if the outcome is to increase student awareness of their right and responsibility to express opinions, student groups could write and submit their ideas to a public opinion section of a local news website.

Technology as a Research Tool. The Internet provides students instant access to limitless resources. Therefore, they can readily "apply digital tools to gather, evaluate, and use information" (NETS-S 3) (ISTE, 2007). As a teacher, it is critical for you to plan activities that actively engage students in processing information and reporting results that are meaningful for the assigned task. Student research should also include information from books, periodicals, and people, because multiple resources will better ensure that students do not merely cut and paste web-based information into their work. For instance, if your students are to create a concept map of events influencing the rights of women, you want to set expectations for using multiple digital and nondigital resources, paraphrasing content, and providing appropriate citations.

Technology as a Problem-Solving and Decision-Making Tool. "Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources" (NETS-S 4) (ISTE, 2007). Never before have students had access to such vast amounts of data and information. Students of all ages can more closely examine information than any previous generation through tools such as electronic devices (e.g., science probes and microscopes), digital audio and video equipment (e.g., cameras and whiteboards), and software in general (e.g., spreadsheets and databases). If students were addressing the question "Does the person with the most popular votes win?" they could download election results into a spreadsheet to compare electoral votes to popular vote totals. To determine whether artificial ponds are as safe for fish as natural ponds, students could gather water samples and use a variety of electronic probes to collect data to compare in a spreadsheet. Young students learning colors could solve the following problem: "Can you find a rainbow in our room?" Student pairs would use a digital camera to photograph items matching each color of the rainbow for a "Rainbows in Our Room" activity book.



Practicing a desired skill promotes the effectiveness of the learning experience.
Jim Damaske/Zuma/Newscom (top), Michele Miller/Zuma/Newscom (bottom).

Technological tools specifically designed to engage students in problem solving include computer games and simulations. Games use competition, intrigue, and inquisitiveness as vehicles for students to gain content knowledge. An

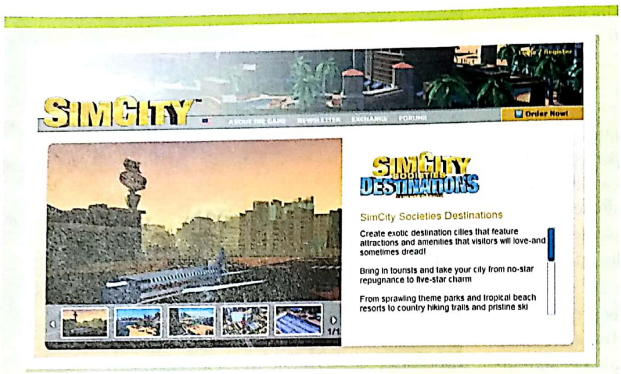


Figure 3.2

SimCity Societies Destinations

SimCity Societies Destinations engages students in problem-solving and decision-making experiences.

Source: Sim Cities Societies Destinations materials © 2010 Electronic Arts, Inc. All rights reserved. Used with permission.

excellent example is Math Blaster, award-winning software that engages students in fast-action games to learn standards-based math content. Simulations use the same features, yet allow learners great flexibility in making choices that affect outcomes in the games. SimCity is a well-known simulation game in which students design and manage a city from the "ground up" (Figure 3.2)

Using Educational Software for Practice. In addition to NETS-S activities, educational software provides excellent resources for engaging students with diverse abilities in individualized learning activities focused toward basic knowledge and skills. The programs allow students of lower-than-average abilities to move at their own pace while providing immediate feedback and remediation. Other students can try more challenging activities after demonstrating mastery of previous skills.

Using Other Media for Practice. Discussions, short quizzes, and application exercises can provide opportunities for practice and feedback during instruction. Teacher guides and manuals often suggest techniques and activities for eliciting and reinforcing student responses. However, many of these resources do not integrate the use of technology and media. Therefore, you will need to use applicable components of the ASSURE model to decide where student use of these tools is appropriate.

Require Learner Participation

ASSURE Classroom Case Study

Student Practice Activities

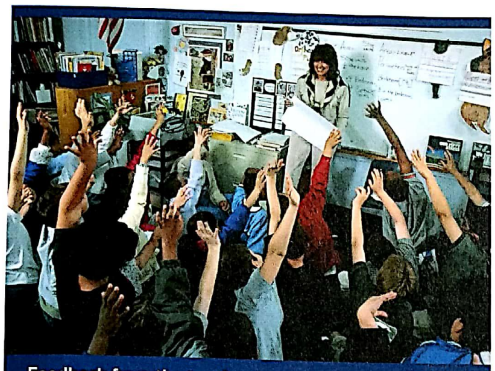
Students individually write responses to the reflection question, "What did I learn this year about myself; about reading, writing, and learning; and about life generally?" Students have the option of using written or video reflections.

The students use computers and DreamWeaver software as production tools to add reflection pages to their personal electronic portfolios. Students who choose to write their reflections add them directly to the page. Those choosing video meet with Ms. Ahu to record their reflections with a digital camera. The file is then transferred to students' computers for editing with iMovie before uploading to their electronic portfolios.

Feedback

Tiare Ahu uses the assignment criteria to review each student's electronic portfolio. She adds individualized comments to each student's file in the gradebook section of Blackboard for the electronic portfolio assignment.

The various levels of student participation required for Tiare Ahu's ninth-grade students to create electronic portfolios are captured on the video for this chapter. Also included are scenes showing her providing feedback to students about their work. Visit the Chapter 3 section of MyEducationKit to view the video of Ms. Ahu's ninth-grade English class.



Feedback from the teacher helps students improve their learning.
Bill Aron/PhotoEdit

FEEDBACK

In all cases, learners should receive feedback on the correctness of their response. The feedback may come from the teacher, or students may work in small groups and give one another feedback. Feedback may also be part of a self-check activity done independently or with a mentor, often using the computer. Regardless of the source, the important thing is that students receive helpful feedback (as in the ASSURE case study on the previous page).

EVALUATE AND REVISE

The final component of the ASSURE model, Evaluate and Revise, is essential to the development of quality instruction, yet this component of lesson design is often neglected. Without this step, it is often impossible to know whether instruction is successful or how to revise unsuccessful strategies. It also makes it difficult to judge the efficacy of different types of technology and media.

ASSESSING LEARNER ACHIEVEMENT

The ultimate question regarding instruction is whether students have learned what they were supposed to learn. Can they demonstrate the capabilities specified in the stated standards and objectives? The first step in answering this question was taken near the beginning of the ASSURE model, when you formulated your learning objectives, including a criterion of acceptable performance. Now you need to develop assessment tasks that require students to demonstrate the behavior stated in the objective.

The method of assessing achievement depends on the nature of the objective. Some learning objectives call for relatively simple cognitive skills—for example, stating Ohm's law, distinguishing adjectives from adverbs, or summarizing the principles of the Declaration of Independence. Learning objectives such as these lend themselves to conventional written tests.

Other objectives may call for process-type behaviors (e.g., diagramming a sentence, solving quadratic equations, or classifying animals), the creation of products (e.g., a sculpture, a written composition, a PowerPoint presentation, or a portfolio), or an exhibit of attitudes (e.g., choosing to read during free-time activities, placing used paper in the recycle bin, or eating healthy snacks). This type of learning objective requires a more comprehensive, **authentic assessment,** such as a performance-based evaluation of a student's demonstration of learning in a natural context.

Authentic Assessment. Rising interest in authentic assessment of students is driven by commitment to a constructivist perspective. Authentic assessments require students to use processes appropriate to the content and skills being learned and to how they are used in the real world. It is the difference between learning science facts and doing what scientists do. How many people take paper-and-pencil tests as a part of their occupation? A special type of authentic assessment, the **portfolio,** made up of student-selected exemplary work representing performance over time along with student reflections on why this work represents their best effort, will be discussed next in its own subsection.

Authentic assessments can be applied to most performances or products. The most commonly used rating scales for authentic assessments include performance checklists, attitude scales, product-rating checklists, and rubrics.

When assessing basic process skills, a performance checklist can be an effective, objective way of recording student performance. Figure 3.3 shows a primary grade checklist for using an audio storybook. Notice the simple Yes or No recording system.

Although attitudes are admittedly difficult to assess, measurement tools have been devised, such as attitude scales (see the biology example in Figure 3.4). The five-point scale (Strongly Agree to Strongly Disagree) offers the opportunity to capture a range of attitudes. A number of other suggestions for attitude measurement can be found in Robert Mager's *How to Turn Learners On . . . Without Turning Them Off* (see this chapter's Suggested Resources).

For product skills, a product-rating checklist can guide your evaluation of critical subskills and make qualitative

Performance Checklist: Using an Audio Storybook

Name _____ Class _____

Indicate Yes or No with an "X" in the appropriate column.

Did the Student	Yes	No
1. Locate the assigned audio storybook?		
2. Complete the Material Checkout Form for the storybook?		
3. Select the appropriate CD player?		
4. Select the appropriate headphones?		
5. Correctly insert the storybook CD?		
6. Correctly connect the headphones?		
7. Play the CD and follow along as the storybook was read?		
8. Remove the CD and headphones when the story was finished?		
9. Return the audio storybook, CD player, and headphones to the proper location?		
10. Complete the Materials Return Form?		

Teacher Name _____ Date _____

Figure 3.3
A Sample Performance Checklist

judgments more objective, as in the rating form in Figure 3.5 for a student-created digital concept map. This checklist provides more detailed information regarding student performance because each product component is rated from Poor to Excellent rather than with a Yes/No scale.

Used to provide a more comprehensive assessment of student performance, a **rubric** is a set of assessment criteria for appraising or judging student products or performances. A rubric typically consists of a rating scale for performance criteria based on level-of-performance descriptors. The performance criteria are the key areas of focus for the performance or product (e.g., problem presentation, supporting graphics, appropriate labels). Rating scales to measure achievement of performance criteria normally range from three to six levels designated by names and/or numbers. A 3-point scale might be shown as (1) Needs Work, (2) OK, and (3) Good. An example 4-point scale might show the following levels: (1) Beginning, (2) Developing, (3) Accomplished, and (4) Exemplary. The descriptors for the levels of performance describe the student performance or product at each level of performance. By comparing an actual student product or performance to the descriptors, a teacher can give a numerical score. An example rubric for a multimedia product is presented in Figure 3.6 (p. 59). See Free and Inexpensive: Rubrics for rubric resources. Standards for the English Language Arts, by the International Reading Association and the National Council of Teachers of English, Copyright 1996 by the International Reading Association and the National Council of Teachers of English. Reprinted with permission. www.ncte.org/standards

FREE & INEXPENSIVE

RUBRICS

Rubistar

http://rubistar.4teachers.org/index.php

Rubistar is a free online tool designed to assist teachers in creating a variety of rubrics. The website has numerous examples of rubrics that can be accessed through key word searches. If you are new to rubrics, the site offers a rubric tutorial. When you are ready to try it out, Rubistar provides an easy-to-use template to create and print rubrics. If you complete the registration, you can save and edit rubrics online.

Kathy Schrock's Assessment and Rubric Information

http://school.discovery.com/schrockguide/assess.html#rubrics

This site provides a vast array of links to rubric resources. The links are categorized by Student Web Page Rubrics, Subject-Specific and General Rubrics, Rubric Builders, Educator Technology Skills and Rubrics, and Related Articles.

Rubrics and Evaluation Resources

www.ncsu.edu/midlink/ho.html

This site provides a collection of rubric resources that range from specific rubrics (e.g., book report rubric, multimedia project rubric, and writing assessment rubrics) to generic rubric templates.

Attitude Scale: Biology

Each of the statements below expresses a feeling toward biology. Please rate each statement on the extent to which you agree. For each, you may select (A) strongly agree, (B) agree, (C) undecided, (D) disagree, or (E) strongly disagree.

A	B	C	D	E
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

____ 1. Biology is very interesting to me.
____ 2. I don't like biology, and it scares me to have to take it.
____ 3. I am always under a terrible strain in biology class.
____ 4. Biology is fascinating and fun.
____ 5. Learning biology makes me feel secure.
____ 6. Biology makes me feel uncomfortable, restless, irritable, and impatient.
____ 7. In general, I have a good feeling toward biology.
____ 8. When I hear the word *biology*, I have a feeling of dislike.
____ 9. I approach biology with a feeling of hesitation.
____ 10. I really like biology.
____ 11. I have always enjoyed studying biology in school.
____ 12. It makes me nervous to even think about doing a biology experiment.
____ 13. I feel at ease in biology and like it very much.
____ 14. I feel a definite positive response to biology; it's enjoyable.

Figure 3.4
A Sample Attitude Scale

Portfolio Assessment. If your assessment plan involves determining the overall individual performance of each student, traditional or electronic portfolio assessments can help achieve your goal. Portfolios are used to assess tangible products that exemplify student accomplishments in terms of analysis, synthesis, and evaluation. A key component of portfolios is their requirement for student self-reflection on their own learning as demonstrated in the portfolio products. For example, students are asked to select a piece of work that demonstrates achievement of a learning objective and then to explain why they chose the piece and how it shows the target knowledge and skills. The reflections can be extended to develop metacognitive skills by asking the students to describe what they would do differently to improve their learning.

To use portfolios, begin by deciding between traditional or electronic formats. Then identify the types of artifacts that will demonstrate student achievement of the standards and objectives and select or develop an appropriate rating scale (as described previously). The rubrics should be given to students before they begin working on the products. The types of artifacts that a portfolio might contain include the following:

- Written documents such as poems, stories, or research papers
- Audio recordings of debates, panel discussions, or oral presentations
- Video recordings of skits, lab experiments, or 3D models
- Computer multimedia projects such as animated timelines, podcasts, or WebQuests

Traditional vs. Electronic Portfolios. Traditional portfolios are physical collections of student work, whereas electronic portfolios contain digital work. Traditional portfolios consist of paper documents, photos, video and audio recordings, or perhaps 3D models. The portfolios are often kept in large

Product Evaluation Checklist: Digital Concept Map

Name _____ Date _____

Rate the digital concept map on the basis of content and layout by checking the appropriate box.

Content	Poor	Fair	Good	Very Good	Excellent
• Key ideas are represented	☐	☐	☐	☐	☐
• Supporting ideas are logical	☐	☐	☐	☐	☐
• Information is accurate	☐	☐	☐	☐	☐
• Paraphrasing is appropriate	☐	☐	☐	☐	☐
Comments about the content:					
Layout					
• Main idea shapes are appropriate	☐	☐	☐	☐	☐
• Supporting idea shapes are appropriate	☐	☐	☐	☐	☐
• Connecting lines are meaningful	☐	☐	☐	☐	☐
• Graphics support concepts	☐	☐	☐	☐	☐
• Use of colors is appropriate	☐	☐	☐	☐	☐
• Font is clear and easy to read	☐	☐	☐	☐	☐
Comments about the layout:					

Overall Evaluation:

____ Poor
____ Fair
____ Good
____ Very Good
____ Excellent

Overall Comments:

Figure 3.5
A Sample Product Evaluation Checklist

three-ring binders and storage boxes, which are moved from teacher to teacher as the student progresses through school. As can be imagined, over time the portfolios can become quite large and hard to manage and store.

Electronic portfolios (called **e-portfolios**), on the other hand, store all the student work as digital files. For example, any computer-generated products, such as spreadsheets, word-processed reports, or WebQuests, can be directly added to the portfolio. Student work created on paper, such as drawings, handwritten poems, or illustrated stories, can be converted into digital format with a scanner (see MyEducationKit Tutorials for "Skill-Builder Tutorial: Scanning"). By capturing actual student performance, digital audio and video are also important components of an electronic portfolio, including readings, skits or presentations, student-created 3D models, or lab experiments conducted by students. The digital format also allows students to add their self-reflections as text or audio narration.

Multimedia Product Rubric

Student's Name _____ Date _____

Category	4	3	2	1
Content	Covers topics in-depth with details and examples. Subject knowledge is excellent.	Includes essential knowledge about the topic. Subject knowledge appears to be good.	Includes essential information about the topic but there are 1–2 factual errors.	Content is minimal OR there are several factual errors.
Sources	Source information collected for all graphics, facts, and quotes. All documented in desired format.	Source information collected for all graphics, facts, and quotes. Most documented in desired format.	Source information collected for all graphics, facts, and quotes, but not documented in desired format.	Very little or no source information was collected.
Organization	Content is well organized, uses headings or bulleted lists to group related material.	Uses headings or bulleted lists to organize, but the overall organization of topics appears flawed.	Content is logically organized for the most part.	There was no clear or logical organizational structure, just lots of facts.
Requirements	All requirements are met and exceeded.	All requirements are met.	One requirement was not completely met.	More than one requirement was not completely met.
Originality	Product shows a large amount of original thought. Ideas are creative and inventive.	Product shows some original thought. Work shows new ideas and insights.	Uses other people's ideas (giving them credit), but there is little evidence of original thinking.	Uses other people's ideas, but does not give them credit.

Figure 3.6

A Sample Multimedia Selection Rubric

Source: Adapted from 4teachers.org's Rubistar http://rubistar.4teachers.org/index.php. Copyright 1995–2006 ALTEC, the University of Kansas. Funded by the U.S. Department of Education Regional Technology in Education Consortium, 1995–2005 to ALTEC (Advanced Learning Technologies in Education Consortia) at the University of Kansas, Center for Research on Learning.

Electronic portfolios can be created with specialized portfolio software, at online sites, or with combinations of basic software such as PowerPoint. Drawbacks for electronic portfolios include availability of equipment and time as well as questions of access and security. All students as well as the teacher need access to the tools. Moreover, creating e-portfolios is initially time-consuming because teachers and students need to learn how to scan, save, and format documents in a useful and appealing manner. However, once the process is mastered, e-portfolios take less time to maintain and obviously require less storage space than traditional portfolios. Security is a concern when deciding who will have access to the files among parents, principals, counselors, teachers, and other students. For some practical tips on using Google Docs as an open source software solution for e-portfolios (Figure 3.7), visit Dr. Barrett's "ePortfolios with GoogleApps" at http://sites.google.com/site/eportfolioapps/Home.

EVALUATING AND REVISING STRATEGIES, TECHNOLOGY, AND MEDIA

Evaluation also includes assessment of strategies, technology, and media. Were the instructional strategies effective?

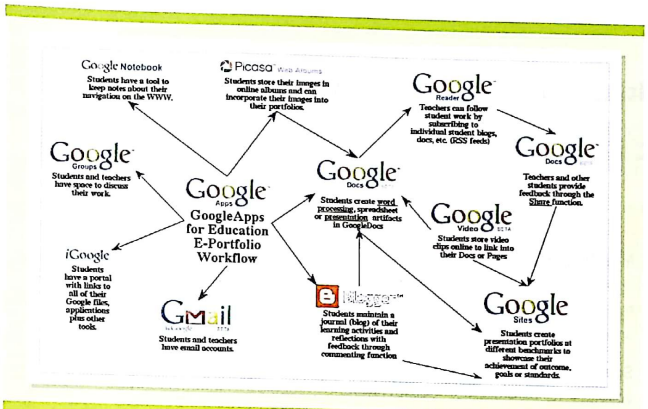


Figure 3.7
GoogleApps
GoogleApps provides multiple tools for use with e-Portfolios.
Source: http://electronicportfolios.com/google/index.html. © 2007, Helen Barrett, Ph.D.

Could they be improved? Did the technology and media assist students in meeting the learning objectives? Were they effective in arousing student interest? Did they support meaningful student participation? A key component to the evaluation and revision of a lesson is learner input. You may solicit learner input on the effectiveness of specific media, such as a video, an activity, or on the entire lesson. A student survey similar to Figure 3.8 can be used to collect learner comments.

You can also obtain student feedback regarding your instructional strategies and use of technology and media through discussions and interviews. For example, you may learn that students would have preferred independent study to your choice of group presentation. Or perhaps students didn't like your selection of online resources and feel they would have learned more from watching a video. Your students also may let you know, subtly or not so subtly, that your own performance left something to be desired.

Evaluation of the Teacher. A critical component of any classroom setting is the teacher, who should be evaluated along with other instructional components. Although evaluation of your teaching may evoke some apprehension, the resulting information will provide excellent feedback for addressing areas of needed improvement—and for celebrating areas of high-quality teaching. There are four basic types of teacher evaluation: self, student, peer, and administrator.

For self-evaluation, you can create an audio or video recording of your instruction that you then listen to or view at a later time while using an evaluation form such as Figure 3.9.

Student Rating Form for Classroom Teaching	Your Reaction
1. I could easily understand the teacher.	☺ 😐 ☹
2. I could always hear the teacher.	☺ 😐 ☹
3. I paid attention.	☺ 😐 ☹
4. I felt involved.	☺ 😐 ☹
5. The teacher looked at me.	☺ 😐 ☹
6. Overall, I would grade the presentation	A B C D F

Completed forms to be collected by a student

Figure 3.8
Sample Form Used by Students to Evaluate Their Teachers

Work closely with students to obtain their reactions to specific learning activities.
Harry Cabluck/AP

Presentation Evaluation Form

Teacher _____ Evaluator _____ Date _____

SA = Strongly Agree A = Agree D = Disagree SD = Strongly Disagree

1.	Presenter appeared nervous.	SA	A	D	SD
	Comment				
2.	Content was delivered well.	SA	A	D	SD
	Comment				
3.	Movement enhanced presentation.	SA	A	D	SD
	Comment				
4.	Voice was natural and conversational.	SA	A	D	SD
	Comment				
5.	Vocal variety was used.	SA	A	D	SD
	Comment				
6.	Presenter could be easily heard.	SA	A	D	SD
	Comment				
7.	There were no distracting mannerisms.	SA	A	D	SD
	Comment				
8.	Eye contact was established and maintained.	SA	A	D	SD
	Comment				
9.	Natural gestures were used.	SA	A	D	SD
	Comment				
10.	Overall, presentation was well done.	SA	A	D	SD
	Comment				

Strengths of presenter .....

Weaknesses of presenter .....

Overall comments .....

Figure 3.9
Sample Instructor Evaluation Form for Self, Peer, or Administrator

Evaluate and Revise

Assessment of Learner Achievement

Tiare Ahu uses the following rating form to evaluate students' Final Year Reflections:

Reflection Rating Scale

1 = Response is minimal, primarily states facts

2 = Response is adequate, reveals moderate reflection

3 = Detailed response that demonstrates meaningful reflection

- At what level did the student write reflections for each item in question 1? "What did I learn about the following?"
  - Myself
  - Reading
  - Writing
  - Learning
  - Overall
- At what level did the student write a reflection for question 2? "What do I hope to accomplish in these areas next year when I am a sophomore?"

Technology Rating Scale

1 = Did not complete task as described

2 = Completed task as described

- Did the student use DreamWeaver software to create a new page titled "Final Year Reflections" in his or her electronic portfolio folder?
- Did the student add a written or video reflection to the "Final Year Reflections" page in their DreamWeaver electronic portfolio folder?

Evaluation of Strategies, Technology, and Media

To evaluate the strategies, technology, and media utilized, Tiare Ahu conducts debriefing activities with the students. In addition, she talks informally with students during the entire process. Ms. Ahu invites comments that address the importance of using an electronic portfolio to assess learning over time. The primary purpose of this debriefing session is to determine whether the students think creating electronic portfolios is worthwhile. In addition, they are asked to write their ideas for improving the lesson.

Revision

The students and Ms. Ahu complete a teacher-developed form for an overall evaluation of learner achievement, strategies, technology, and media. Ms. Ahu compares the student responses and overall average rating with her own perceptions. For items that appear discrepant, Tiare will address the need for revision in her choice of learning activities, technology and media selections, and evaluation materials.

Tiare Ahu shares her ideas and strategies for evaluating her ninth-grade students' electronic portfolios in the video for this chapter. Visit the Chapter 3 section of MyEducationKit to view the video of Ms. Ahu's ninth-grade English class working on their electronic portfolios.

Students, even in early grades, can provide valuable feedback through age-appropriate surveys. Students may be reluctant to "evaluate" their teacher in open-class discussions, but might share ideas in a group or submit comments anonymously.

You may ask a colleague, usually another teacher, to sit in the back of the room and observe your teaching skills. Feedback could be given in an open-ended evaluation (blank sheet of paper) or you may design a form that addresses areas for which you would like to receive feedback.

In most schools, administrators visit teachers on a scheduled sequence, often annually or semiannually. You may ask an administrator to visit more frequently on an "unofficial" basis. Many schools have a standard form that administrators use to observe teachers and provide feedback to them. You may also inform your administrator of other characteristics you would like her to observe.

Revision of Strategies, Technology, and Media. The final step of the instructional cycle is to sit back and look at your assessment and evaluation data. Examine discrepancies between your intentions and what actually happened. Did student achievement fall short on one or more of the learning objectives? How did students react to the instructional strategies, technology, and media? Are you satisfied with the value of the materials you selected?

Reflect on the lesson and each component of it. Make notes immediately following completion of the lesson, and refer to them before you implement the lesson again. If your evaluation data indicate shortcomings, now is the time to go back to the faulty part of the plan and revise it. The model works, but only if you constantly use it to upgrade the quality of your instruction (as in the ASSURE case study on the previous page).

SUMMARY

This chapter introduced you to the ASSURE model and demonstrated how it can be used to plan lessons that effectively use technology and media to support and enhance student learning. The model incorporates critical aspects of instructional planning by addressing the following questions:

- Who are your learners?
- How do your learning objectives meet the standards?
- Which strategies, technology, media, and materials will you select for your learners?
- How can you and your learners make the best use of materials?
- How will learners be involved in learning?
- How will you evaluate both the learners and your instruction?
- What revisions are needed if you implement the lesson again?

PEARSON myeducationkit™

To check your comprehension of the content covered in Chapter 3, go to the **MyEducationKit** for your book and complete the Study Plan for Chapter 3. Here you will be able to take a chapter quiz, receive feedback on your answers, and then access resources that will enhance your understanding of the chapter content.

ASSURE Lesson Template

Analyze Learners

- General Characteristics (Describe the class as a whole—age, grade, etc.)
- Entry Competencies (Describe the types of knowledge expected of the learners before instruction.)
- Learning Styles (Describe the learning style preferences of individual students.)

State Standards and Objectives

- List curriculum and technology standards to be achieved.
- Describe the learning objectives using the ABCD format.

Select Strategies, Technology, Media, and Materials

- Describe the strategies, technology, media, and materials that are essential to the lesson.
- Provide rationales for selections.
- Use Selection Rubrics to evaluate the appropriateness of technology and media.

Utilize Technology, Media, and Materials

- Preview Technology, Media, and Materials (It is essential to know the technology, media, and materials prior to teaching with them.)
- Prepare Technology, Media, and Materials (Practice using the technology, media, and materials prior to the lesson.)
- Prepare the Environment (Arrange the facilities for effective use of the technology, media, and materials.)
- Prepare the Learners (Knowing what is expected of them helps ensure learner involvement in the learning.)
- Provide the Learning Experience (Provide teacher-centered and student-centered learning experiences.)

Require Learner Participation

- Require active mental engagement by learners.
- Engage learners in practice of new knowledge or skills.
- Support learning with technology and media.
- Provide performance feedback prior to formal assessment.

Evaluate and Revise

- Use traditional and authentic assessments to determine learner achievement of stated standards and objectives.
- Examine the entire instructional process and the impact of using technology and media.
- If discrepancies between learning objectives and student outcomes are identified, revise the lesson plan to address the areas of concern.

CONTINUING MY PROFESSIONAL DEVELOPMENT

Demonstrating Professional Knowledge

1. What are the primary types of criteria used to analyze learners?
2. Why are learning objectives an important aspect of lesson planning?
3. What are the four components of a well-written objective?
4. List and describe the procedures for selecting, modifying, and designing strategies, technology, and media.
5. What are the five basic steps for utilizing technology, media, and materials?
6. Describe methods of eliciting student participation when using technology and media during instruction.
7. In what ways are the techniques for evaluating student achievement, technology, media, strategies, and instruction similar and different?

Demonstrating Professional Skills

The Demonstrating Professional Skills activities are designed to address many of the International Society for Technology in Education's National Educational Technology Standards for Teachers (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 objectives and associated assessment instruments (including traditional and authentic assessments). (NETS-T 2.A, 2.C, & 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 My 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.

- *Creating My Lesson.* Using the ASSURE model, design a lesson for a scenario from the Lesson Scenario table in the Appendix, 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, & 4.B)

- *Reflecting on My Lesson.* Reflect on the lesson you created for this chapter and on how you enhanced the lesson. Address the following in your reflections: How did use of the ASSURE model strengthen the lesson? What aspect of the ASSURE model do you consider the most critical for the lesson you created? How could your ASSURE lesson be improved? (NETS-T 4.B & 5.C)

SUGGESTED RESOURCES

Print

Arter, J., & Chappuis, J. (2006). *Creating and recognizing quality rubrics.* Portland, OR: Educational Testing Service.

Bailey, G., & Ribble, M. (2007). *Digital citizenship in schools.* Washington, DC: International Society for Technology in Education.

Bray, M., Brown, A. H., & Green, T. D. (2005). *Technology and the diverse learner: A guide to classroom practice.* Thousand Oaks, CA: Corwin.

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

Carr-Chellman, A. A. (2010). *Instructional design for teachers.* New York: Routledge.

Chapman, C., & King, R. S. (2006). *Differentiated reading and writing strategies for middle and high school classrooms: A multimedia kit for professional development.* Thousand Oaks, CA: Corwin.

Hartnell-Young, E., & Morriss, M. P. (2006). *Digital portfolios: Powerful tools for promoting professional growth and reflection.* Thousand Oaks, CA: Corwin.

Jones, S. J. (2003). *Blueprint for student success: A guide to research-based teaching practices K–12.* Thousand Oaks, CA: Corwin.

Keller, J. M. (1999). Using the ARCS motivational process in computer-based instruction and distance education. *New Directions for Teaching and Learning, 78,* 39–47.

Klein, M. S., Cook, E. W., & Richardson-Gibbs, A. M. (2001). *Strategies for including children with special needs in early childhood settings.* Florence, KY: Thomson Delmar Learning.

Mager, R. F. (2003). *How to turn learners on . . . without turning them off* (3rd ed.). Atlanta, GA: Center for Effective Performance.

O'Donoghue, J. (2006). *Technology supported learning and teaching: A staff perspective.* Hershey, PA: Information Science.

Ormrod, J. E. (2005). *Artifact case studies: Interpreting children's work and teachers' classroom strategies.* Upper Saddle River, NJ: Merrill/Prentice Hall.

Stiggins, R. J. (2005). *Student-involved classroom assessment* (4th ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.

Stiggins, R. J., Arter, J., Chappuis, J., & Chappuis, S. (2004). *Classroom assessment for student learning—Doing it right, using it well.* Portland, OR: Assessment Training Institute.

Tomei, L. A. (2003). *Challenges of teaching with technology across the curriculum: Issues and solutions.* Hershey, PA: Information Science.

Walker-Tileston, D. E. (2006). *Teaching strategies for active learning: Five essentials for your teaching plan.* Thousand Oaks, CA: Corwin.

Web Links

To easily access these web links from your browser, go to the MyEducationKit for your text, then go to Chapter 3 and click on the web links.

Electronic Materials for Children and Young Adults

www.eduscapes.com

This site offers links to educational materials for a range of learners on multiple topics.

EvaluTech: Timely, Reliable, Useful, and Free Resources for Teachers

www.evalutech.sreb.org

A variety of evaluation tools for teachers are located on this site.

ISTE Wikispaces: NETS-S 2007 Implementation Wiki

http://nets-implementation.iste.wikispaces.net

This wiki hosts discussions on how to implement the 2007 NETS for Students into classroom instruction. The site provides opportunities to participate in surveys about technology integration practices and policies.

How to Do Research on the Internet

www.lib.monash.edu.au/vl/www/wwwcon.htm

This site offers detailed steps for conducting Internet-based research. It provides hints for achieving successful searches, how to evaluate the content on websites, and how to provide correct citations.

Tech & Text Teaching Techniques

www.techlearning.com/story/showArticle.jhtml?articleID=185303854

Susan Bishop offers numerous tips for using technology to teach a variety of subject areas.

Web Walkabout: Educational Resources by Subject

http://ntweb.mcps.k12.md.us/schools/travilahes/walkabout.html

This is a very useful site when looking for web-based classroom materials for a specific subject area and grade level.

Writing Educational Goals and Objectives

www.personal.psu.edu/staff/b/x/bxb11/Objectives/index.htm

Hosted by Penn State, this website provides teachers easy-to-follow guidelines for writing educational goals and objectives. The site also includes multiple examples of goals and objectives for various subject areas and grade levels.