Preparing
for Tomorrow's Challenges

From Chapter 12 of *Instructional Technology and Media for Learning*, 10/e. Sharon E. Smaldino. Deborah L. Lowther. James D. Russell.
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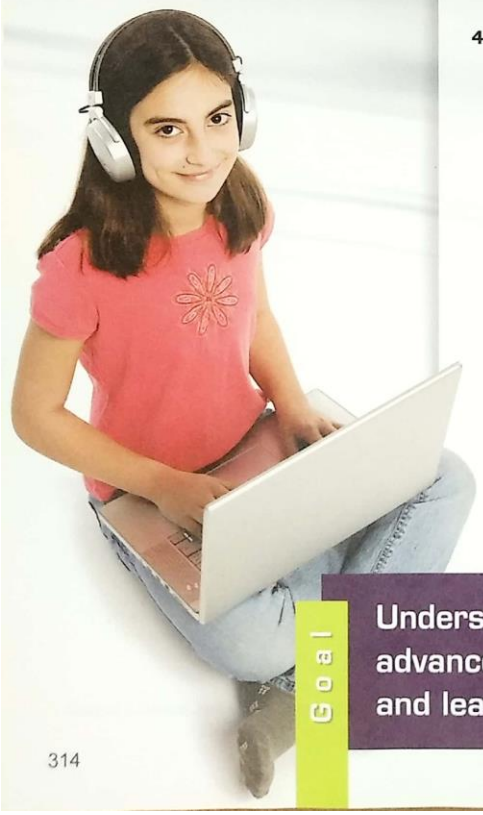
Preparing for Tomorrow's Challenges

Knowledge Outcomes

1. Describe how the ASSURE model supports 21st century learning as described in the National Education Technology Plan.
2. Discuss the characteristics of a 21st century teacher who is technologically competent, information literate, and committed to professional growth and engagement.
3. List ways that 21st century environments use technology for inclusion, to connect schools and homes, and to offer the choice of online education.
4. Describe the types of technology grants available for 21st century learning and briefly explain the basic components included when writing a grant proposal.



Goal

Understand factors influencing the advancement of 21st century teaching and learning

INTRODUCTION

Today's schools and teachers must continually advance 21st century learning as our society transitions to innovative digital tools for work, communication, and entertainment. This advancement can be supported with use of the ASSURE model and technology-focused professional development to guide teacher implementation of 21st century learning environments. Technology grants can assist schools in increasing student access to cutting-edge technology and media that build 21st century knowledge and skills.

THE ASSURE MODEL AND 21ST CENTURY LEARNING

The ASSURE model is structured to help teachers achieve 21st century classrooms. By following the step-by-step ASSURE model, teachers receive the support and guidance to develop, implement, evaluate, and revise lessons that integrate technology to increase student learning and prepare them for future careers. The ASSURE model directly supports the following learning goal in the National Educational Technology Plan (NETP) (US DOE, 2010):

> Goal: All learners will have engaging and empowering learning experiences both in and outside of school that prepare them to be active, creative, knowledgeable, and ethical participants in our globally networked society. (p. 9)

The first step in the ASSURE model, *Analyze learners*, asks teachers to identify the needs of all learners to better ensure that they have the resources and individualized support to participate in learning experiences. The next four steps help teachers to strategically plan technology integration lessons:

2. *State standards and objectives*
3. *Select strategies, technology, media, and materials*
4. *Utilize technology, media, and materials*
5. *Require learner participation*

These steps guide teachers in strategically planning and implementing learning experiences that align with key strategies in the NETP goal—engaging and empowering activities that encourage active, creative, and knowledgeable interaction.

The final ASSURE model step, *Evaluate and revise*, involves assessment of both student progress and the instructional process to determine what worked well and what needs to be revised before implementing the lesson again. Application of the ASSURE model enables 21st century teachers to continually engage students in activities that increase 21st century knowledge and skills and better prepare them for successful careers.

21ST CENTURY TEACHERS

The role of a teacher will always include the foundational responsibility of enabling students to learn. However, differences have been seen over time in *how* teachers accomplish this goal. The role of the 21st century teacher still is to improve student learning, but it requires the teacher to have broader capabilities than content knowledge, the ability to use pedagogy in the classroom, and basic computer skills. They also need to be technologically competent and information-literate.

TECHNOLOGICAL COMPETENCE

Teachers in the 21st century need to go beyond computer literacy to attain **technological competence** (Morrison & Lowther, 2010). This means not only knowing the basics of computer literacy, but more importantly, how and when to use technology to enhance student learning. For example, technologically competent teachers seamlessly integrate rich multimedia experiences into classroom activities that engage students in meaningful learning. To individualize instruction, teachers can base expectations on data collected from digital records of daily performance. For assessment, teachers can use digital tools such as e-portfolios that maintain PK–12

archives of student-created digital audio, video, and other documents in individual student portfolios.

INFORMATION LITERACY

Teachers in the 21st century require a high degree of capability with regard to **information literacy.** To prepare for a class, teachers need to locate materials from a variety of online sources and ensure the material is accurate, appropriate, easily accessible, and useable according to copyright guidelines. Teachers should model information literacy skills to their students by demonstrating the following skills:

- Accessing information
- Verifying data
- Appropriately acknowledging information sources
- Following copyright regulations

To keep students and parents informed of learning expectations and activities and regularly communicate with parents through email and discussion boards, 21st century teachers should develop and maintain a classroom website. They also need to exemplify a willingness to explore and discover new technological capabilities that enhance and expand learning experiences. This involves an openness to learn from and ask students for their thoughts about applying innovative technologies to examine and solve real-world problems—thus better preparing students to demonstrate these abilities in their future careers. Teachers should also regularly participate in opportunities to increase their experience in using technology and media for learning.

TECHNOLOGY-FOCUSED PROFESSIONAL DEVELOPMENT

As with any profession, long-term and consistent professional development is necessary for teachers to maintain proficiency and to have a positive impact on student learning. The same is true for teacher professional development focused on effective use of technology, which consists of six components (ISTE, 2009b) (see Figure 12.1):

1. Preservice technology training aligned to inservice expectations
2. Modeling of technology use by trainers and experienced teachers
3. Communities of practice
4. Professional engagement
5. School and district leadership in (and modeling of) technology use
6. Online learning (both the type and topic of professional development) (p. 8)

The National Educational Technology Standards for Teachers (NETS-T) describe classroom practices, lesson development, and professional expectations for 21st century teachers (ISTE, 2008). The content and activities of technology-focused professional development (PD) should address the NETS-T through face-to-face or virtual sessions in the following modalities:

- District or school-provided inservice vendor sessions
- Workshops or webinars at educational conferences
- Graduate coursework

Virtual PD also includes teacher communities of practice, in which teachers with common interests share best practices, solutions, and often join advocacy initiatives.

Figure 12.1
Components of Professional Development for Effective Technology Use
ISTE's model for Professional Development for Effective Technology Use includes six components dependent on long-term, consistent professional development implementation.
Source: ISTE Policy Brief, "Technology and Teacher Quality—The Indelible Link," p. 9. Copyright 2009.

NETS-T 1: Facilitate and Inspire Student Learning and Creativity. Engage teachers in activities that demonstrate how new and innovative uses of technology and media can advance student learning and creativity in face-to-face and virtual environments. PD facilitators can achieve this goal by having teachers assume the role of students while they model a variety of ways to help, facilitate, and inspire learning during the hands-on activities. For example, teachers could create interactive digital posters that demonstrate content and skills to be learned by their students (see Figure 12.2).

Figure 12.2

Creating Interactive Digital Posters

The education version of Glogster provides online tools to create interactive digital posters that can include video, audio, hyperlinks, photos, text, images, and more.

Source: http://edu.glogster.com. Reprinted by permission.

NETS-T 2: Design and Develop Digital-Age Learning Experiences and Assessments. This standard requires teachers to participate in ongoing hands-on activities facilitated by technology coaches or similar PD staff. Teachers should design, develop, and evaluate authentic learning and assessment experiences that require students to use technology and media. The goals of the PD for teachers are to produce lessons that foster student achievement of learning objectives and to meet the NETS for Students standards of technology implementation.

NETS-T 3: Model Digital-Age Work and Learning. As mentioned, it is important for 21st century teachers to be competent users of technology and media. To achieve this goal, many teachers will require PD to help them gain the knowledge and skills to apply digital solutions for modeling digital-age work and learning processes needed in a global and digital society. PD topics can include how to create and maintain a class website, use social networking tools, participate in webinars, and apply digital tools to manage teacher responsibilities.

NETS-T 4: Promote and Model Digital Citizenship and Responsibility. For teachers to gain an understanding of the legal and ethical issues associated with digital citizenship, they need to be provided PD in which they study and practice applying copyright regulations, district acceptable use policies, and other general guidelines such as netiquette rules offered by many different sources. Within these areas it is critical to prepare teachers with knowledge and tools to address digital issues concerning their students, including Internet safety for students, such as never sharing personal information, and cyberbullying, which is student use of "the Internet, cell phones, or other devices to send or post text or images intended to hurt or embarrass another person" (National Crime Prevention Council, 2010).

NETS-T 5: Engage in Professional Growth and Leadership. It is important to provide teachers PD about how to become lifelong learners and how to serve as leaders in the effective use of technology by modeling these skills in their schools, districts, and community. Teachers can also be introduced to technology and media associations and journals as additional options for achieving professional growth and engagement. Reprinted with permission from *National Educational Technology Standards for Teachers: Preparing Teachers to Use Technology* © 2008, (International Society for Technology in Education, www.iste.org). All rights reserved.

PROFESSIONAL ENGAGEMENT

The 21st century is an exciting time for teachers as the opportunities to expand teaching and learning are becoming more and more pervasive in formal and informal education each year. Associated with this growth are the increasing numbers of professional organizations that support educators interested in application of technology and media to improve learning.

Professional Organizations. Whether your interest is in instructional technology and media in general or you intend to specialize in this area of education, it is important to be

familiar with some of the major organizations dedicated to its advancement.

Association for Educational Communications and Technology (AECT). AECT (www.aect.org) is an international organization representing educational technology professionals working in schools, colleges, and universities, as well as the corporate, government, and military sectors. Its mission is to provide leadership in educational communications and technology by linking professionals holding a common interest in the use of educational technology and its application to the learning process. AECT has ten divisions designed around areas of special interest represented within the membership: design and development, distance learning, graduate student assembly, international, multimedia production, research and theory, school media and technology, systemic change, teacher education, and training and performance.

The association maintains an active publications program, including *Tech Trends* and *Educational Technology Research and Development*, both published six times during the academic year, as well as a large number of books and videos. AECT sponsors an annual conference that features over 300 educational sessions and workshops focusing on how teachers are using new technologies and teaching methods in the classroom. It also hosts a summer professional development conference and a biannual research symposium.

Association for the Advancement of Computing in Education (AACE). AACE (www.aace.org) is an international educational and professional organization dedicated to the advancement of the knowledge, theory, and quality of learning and teaching at all levels with information technology. AACE disseminates research and applications through publications and conferences. Journals published by AACE include *Journal of Computers in Mathematics and Science Teaching (JCMST)*, *Journal of Interactive Learning Research (JILR)*, *Journal of Educational Multimedia and Hypermedia (JEMH)*, *Journal of Technology and Teacher Education (JTATE)*, *AACE Journal (AACEJ)*, and *Contemporary Issues in Technology & Teacher Education (CITE)*. Copyright 2010 by the Association for the Advancement of Computing in Education (AACE), www.aace.org. Included here by permission.

American Library Association (ALA). ALA (www.ala.org) is the largest library association in the world. Over 60,000 members represent all types of libraries—public, school, academic, state, and special libraries serving persons in government, commerce, the armed services, hospitals, prisons, and other institutions. The association has 11 divisions focusing on various types of libraries and services. The American Association of School Librarians (AASL), one of the divisions, holds national conferences focusing on the interests of school media specialists. AASL also publishes *School Library Media Research*, which presents research that pertains to the uses of technology for instructional and informational purposes. Special issues have dealt with such themes as communications, technology, and facility design for learning environments that require a great deal of technology.

Global SchoolNet Foundation (GSN). GSN (www.globalschoolnet.org) was founded by teachers with a mission to support 21st century learning through content-driven collaboration among teachers and students in order to improve the academic performance of our students. GSN brings together online youth from 194 countries to explore community, cultural, and scientific issues that prepare them for the workforce and help them to become responsible and literate global citizens. Global SchoolNet's free membership program provides project-based learning support materials, resources, activities, lessons, and special offers from its partners. Reprinted by permission of Global SchoolNet.

International Society for Technology in Education (ISTE). The mission of ISTE (www.iste.org) is to improve education through the use of technology in learning, teaching, and administration. ISTE members include teachers, administrators, computer coordinators, information resource managers, university faculty, and educational technology specialists. The organization maintains regional affiliate memberships to support and respond to grassroots efforts to improve the educational use of technology. Its support services and materials for educators include books, courseware, conferences, and a variety of publications.

ISTE publishes *Learning and Leading with Technology*, *Journal of Research on Computing in Education*, *Journal of Digital Learning in Teacher Education*, *ISTE Daily Leader*, *ISTE Update*, books, and courseware packages. Of particular interest to teachers is *Leading and Learning with Technology*,

which focuses on technology integration in PK–12 classrooms. Many of the articles are written by teachers, sharing what they have accomplished using computers in their classrooms with children of all ages and abilities. Reprinted by permission of International Society for Technology in Education.

The International Technology and Engineering Educators Association (ITEEA). ITEEA (www.iteea.org) is the professional organization for technology, innovation, and design in engineering education. Its mission is to promote technological literacy by supporting the teaching of technology and promoting the professionalism of those engaged in this pursuit. ITEEA strengthens the profession through leadership, professional development, membership services, publications, and classroom activities.

ITEEA publishes two peer-reviewed scholarly journals, *Technology and Engineering Teacher* and the *Journal of Technology Education*. Another journal is *Children's Technology and Engineering* (CTE), which is a useful, engaging tool for K–6 teachers interested in technological literacy. ITEEA also provide *Science, Technology, Engineering, and Mathematics (STEM) Connections*, a free online newsletter to keep teachers current on the latest STEM strategies and resources. Reprinted with permission of ITEEA (www.iteea.org.)

International Visual Literacy Association (IVLA). IVLA (www.ivla.org) is dedicated to exploring the concept of visual literacy—how we use visuals for communication and how we interpret these visuals. It is particularly concerned with the development of instructional materials designed to foster skills in interpreting visuals. The organization draws its members from a variety of disciplines and professions, including public schools, higher education, business and communication, professional artists, production specialists, and design specialists.

United States Distance Learning Association (USDLA). USDLA (www.usdla.org) promotes the development and application of distance learning for education and training. The 20,000 members and sponsors represent PK–12 education, higher education, continuing education, corporate training, telemedicine, and military and government training. The association has become a leading source of information and recommendations for government agencies, the U.S. Congress, industry, and those involved in the development of distance learning programs. USDLA has chapters in all 50 states. It is a sponsor of annual USDLA National Conferences and provides a variety of online resources. In addition, USDLA holds regular meetings with leaders of distance learning programs in Australia, Europe, India, Japan, and the United Kingdom. Reprinted by permission of United States Distance Learning Associates.

State Organizations. Several of the national professional organizations have state and/or local affiliates (AECT, ALA, ISTE, USDLA). By joining one or more of these, you will quickly make contact with nearby professionals who share your particular interests. As a teacher, you will want to be active in at least one local or state organization in addition to active participation in at least one national organization. If you are a full-time student, you can join many organizations at a reduced rate.

Professional Journals. As seen, a key contribution of professional organizations in instructional technology and media is to publish journals of interest to their members. Various other print and electronic periodicals are targeted to educators interested in using educational technology and media. Electronic journals are quickly becoming the journal of choice as they are "green" products that provide teachers with current information that includes interactive links to additional information. Examples of highly-respected journals are noted in the following list.

- *Educational Technology* has been the leading periodical for five decades and is read by educators in over 100 countries. The magazine addresses both teachers and educational technologists, providing articles on a range of topics, from theoretical to practical (www.asianvu.com/bookstoread/etp).
- *T.H.E. Journal* is dedicated to informing and educating PK–12 practitioners to improve and advance the learning process through the use of technology. It has over 90,000 subscribers to a variety of resources, including a monthly print and digital magazine, two websites, and five newsletters (http://thejournal.com).
- *eSchool News* in both print and online publication provides "Technology News for Today's K–20 Educator" covering education technology in all its aspects—from legislation and litigation to case studies and new products. The newspaper has over 300,000 subscribers and the website has over 500,000 unique visitors each month (www.eschoolnews.com).
- *Media and Methods* highlights new software and hardware to assist schools with purchase decisions (www.mediamethods.com).
- *Tech & Learning* (www.techlearning.com) provides district technology coordinators with practical resources and

expert strategies for transforming education through integration of digital technologies. The magazine is also used as a professional development tool to help educators learn about the newest technologies and products in order to best prepare students for the global digital workforce.

Through regular reading of educational technology journals, teachers can expand their professional knowledge and growth by staying informed of new technology and media that have positive impacts on student learning. Teachers can use this knowledge and growth to better create and implement a variety of 21st century learning environments.

21ST CENTURY LEARNING ENVIRONMENTS

Going beyond the traditional classroom, which is dependent on the teacher and textbooks as the primary sources of information, 21st century learning environments expand into "global" classrooms that use technology for inclusion, connecting schools and homes, and offering the choice of online education.

THE GLOBAL CLASSROOM

Our world, through the use of a complex satellite system, is connected with an invisible digital network that truly makes today's classrooms global. Students now learn from a multitude of resources that range from textbooks to live videoconferences with people geographically separated by thousands of miles. Teachers use resources such as ePals LearningSpace (https://learningspace.epals.com), which has supported cross-cultural learning activities through connections among 600,000 teachers and their students in over 200 countries. Teachers can plan lessons with one or two teachers or engage their students in one of the many large interactive research projects involving children from around the globe. Sample projects include *Digital Storytelling*, *The Way We Are*, *Global Warming*, and *Maps* (see Figure 12.3).

The world is also opened to students through live, streamed video that begins playing before the entire file is downloaded from the Web. Students can see live shots from the South Pole, the streets of Vienna, Kenya game reserves, the Eiffel Tower, the Bavarian Forest, Mt. Fuji, a cathedral in Florence, a city market in Hong Kong, or the Olivetti Research Laboratory at Cambridge.

Many of these sites have user controls on the cameras so students can freely explore the distant site from multiple viewpoints. By visiting different countries through live video, student awareness of differences in time is increased as the video may show the sun rising when it is afternoon in the student's classroom. Viewing the world "as it happens" opens student eyes to differences and similarities found in the world's cultures by seeing what people are wearing, driving, eating, and doing.

TECHNOLOGY FOR INCLUSION

In the midst of increased technology access in today's schools, there are still underserved students who experience "digital exclusion" due to disparities in socioeconomic status, ethnicity, geographic location, gender, primary language, and disabilities (Pew Internet & American Life Project, 2007). In particular, low-income and minority learners,

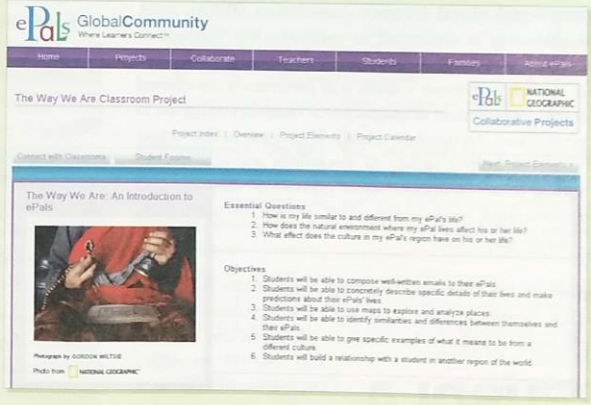


Figure 12.3

ePals Global Community

National Geographic's ePals Global Community provides resources to engage students in interactive projects, such as "The Way We Are," which include collaboration with students from around the world.

Source: www.epals.com/projects/info.aspx?DivID=TheWayWeAre_overview. Reprinted by permission.

English language learners, and learners with disabilities tend to have less access and use of technology in schools (US DOE, 2010). An ISTE report (Davis, Fuller, Jackson, Pittman, & Sweet, 2007) recommends five strategies to address "Digital Equity" challenges:

1. Legitimize the significant role culture plays in students' educational experience.
2. Continue to challenge perceptions about the role of technology in education.
3. Encourage others to recognize the critical link between technology professional development and classroom practice.
4. Create opportunities for students to access technology outside of the classroom.
5. Continue to seek funding for technology in spite of challenges.

Low-Income and Minority Learners. Because students from low-income and/or minority families often have limited access to technology at home as well as to others who regularly use technology, it is important to provide increased opportunities for these students at school. Time at the computer may need to be personalized and include extra remediation on computer skills to put these learners on a more equal footing with students who have home computers and access to family and friends who regularly use computers. Teachers may also want to encourage student participation in after-school and summer programs in which students use technology as a learning tool in community centers, libraries, churches, and so on (Gray, Thomas, & Lewis, 2010).

English Language Learners. Today's schools are faced with growing numbers of English language learners (ELL), English as a second language (ESL), or limited English proficient (LEP) students whose native languages can vary among a multitude of possibilities (National Clearinghouse for English Language Acquisition, 2010). Teachers of English language learners find that technology and media offer useful support and interventions. For example, software that provides audio narration of the content, such as certain tutorials, drill-and-practice, and word processing programs, help students learn correct pronunciation of English words as they read content from the computer screen. Mobile media players, such as iPods, also allow students access to audio recordings in English. Other digital tools that are useful for ELL students are social networking sites, which provide ELL students the opportunity to interact with others who not only speak their native language but also speak English. Teachers can use a combination of technology tools to meet the individualized needs of ELL students.

Learners with Disabilities. The Individuals with Disabilities Education Improvement Act (IDEA) (2004) and the No Child Left Behind (NCLB) (US DOE, 2002) legislation mandate that students with disabilities be taught to the same high standards as students without disabilities. In 2008, this impacted approximately seven million PK–12 students identified as having special needs (Institute of Educational Sciences, 2009).

Innovative advances in technology assist teachers to better meet the special needs of students with learning or physical disabilities. For example, teachers can use specialized software and digital tools to create, maintain, and report student individualized education programs (IEPs) for special needs learners as well as to provide overall special education management support. Iowa provides teachers with Electronic Filemaker IEP software (www.iowa-iep.net), whereas other states and school districts choose to use commercial IEP programs such as Case e special education case management solutions (www.msb-services.com/case-e). Special Education Automation Software (SEAS) provides another management option (www.computerautomation.com).

Advantages of using digital support tools for students with special needs include instant access to digital copies of all required forms. Digital forms use auto-fill capabilities to enter key student data, thus saving time and better ensuring accuracy of information. Teachers can generate and email current reports to parents and other staff. Research-based intervention strategies are readily accessible through digital databases. Records can be directly transferred to district, state, and federal reports. These advances increase the amount of time teachers have to work with and instruct students with special needs because they decrease the time needed for teachers to plan individualized instruction and fulfill compliance reporting requirements.

New technologies also increase teacher capability to adapt classrooms to accommodate learners with special needs. Learning stations can be specially equipped with **assistive technology,** or digital devices and software designed specifically for those with learning or physical disabilities. The assistive technology enables students to control the rate of speech delivery, augment the audio signal in the classroom, enlarge information on a computer screen so they can read the results of a database search better, use a voice synthesizer to have a printed page read to them, or take notes in class through an electronic storage device that will later print out the document in Braille. Some web pages accommodate these needs by offering user-selected graphic and text design options. Interestingly, it often happens that the techniques and alternatives that we use with special needs learners, such as providing handouts and notes for learners with hearing impairments and using audio recordings for

learners with visual impairments, can improve the learning of *all* students.

TECHNOLOGY CONNECTS SCHOOLS AND HOMES

As computers become increasingly popular in today's homes, teachers have greater opportunities to communicate with students and parents. Many teachers maintain class websites that contain teacher contact information, calendars, assignment sheets, parent notices, links to Internet resources, and social networking tools to encourage ongoing communication. Class websites are often supported by a school or district server or by one of the free or inexpensive web hosting services, such as Wikispaces for educators (www.wikispaces.com/site/for/teachers) (see Free and Inexpensive Class Websites at the end of the chapter).

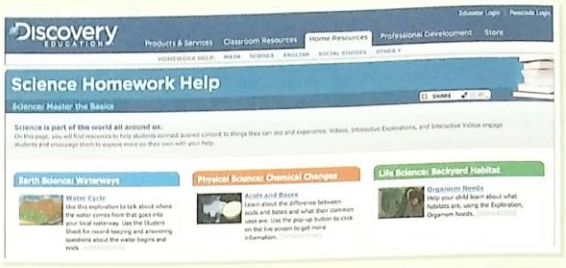


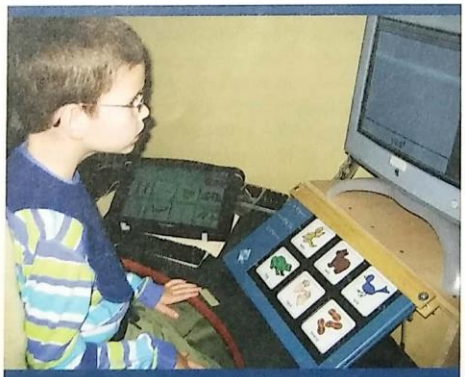
Figure 12.4

Science Homework Help

Discovery Education's Homework Help is an interactive resource that provides students with homework help in a variety of subjects.

Source: http://school.discoveryeducation.com/homeworkhelp/homework_help_home.html

Common links on teacher websites include basic skills practice, online demonstrations, or content-specific reference information. For example, PK–12 students can be directed to the National Library of Virtual Manipulatives for interactive math tools to solve homework problems for numbers and operations, algebra, geometry, measurement, data analysis, and probability (http://nlvm.usu.edu). The Internet also offers students help to complete their work. For example, over 10,000 students visit Discovery Education's Homework Help every day to research questions about their homework and to use the content area resources available on the website (see Figure 12.4).



Assistive technology extends the learning opportunities for students with disabilities.

Courtesy of Flaherty family and at4Learning

Through technology, parents stay informed about homework requirements.

Masterfile RF

Another useful site, Infoplease Homework Center, provides students access to resources categorized by subject area and skills (writing, research, speaking, listening, studying) (www.infoplease.com/homework). The site also has links to searchable references (almanacs, atlas, dictionary, encyclopedia, and biographies), tools (conversion calculator, distance calculator), practice tools (math flashcards, spelling bee), and links to current events by year.

With this increased communication between school and home, it is possible to lengthen the time devoted to learning. Technology permits teachers to send homework and assignments over networks to homes. Parents, students, and teachers are able to interact about the assignment. Students can access their personal data files from home and also connect to instructional materials housed on the school's computer. However, as mentioned, teachers who assign technology-based homework need to assist underserved students in finding alternative ways of accessing digital resources to ensure equitable learning opportunities.

THE CHOICE OF ONLINE EDUCATION

According to the 2010 International Association for K–12 Online Learning (iNACOL) "Fast Facts about Online Learning" report, there has been explosive growth of online learning opportunities in PK–12 environments. Specifically, in 2000, there were approximately 50,000 students enrolled in K–12 online education as compared to 320,000 in 2009 (iNACOL, 2010). Florida Virtual School (FLVS) has grown from being the first state-run Internet-based high school in 1997 to a nationally recognized e-learning model with over 71,000 students enrolled globally in 2009. FLVS reaches beyond Florida by providing customized eLearning Solutions for schools in approximately 40 countries. FLVS is the only public school whose state funding is tied directly to student performance (www.flvs.net). FLVS offers online students multiple resources such as a virtual library, information sessions, student clubs, Facebook updates, and a tour of an online course for new users. Typically, statewide programs are free of cost to residents and often target students in rural, high-poverty, or low-performing schools (see Figure 12.5).

Online courses are often provided on school campuses as a way for students to have access to computers with high-speed Internet access. Scholarships and computer donation programs assist students from low-income families who need to complete online courses at home.

Students of tomorrow will have multiple distance education opportunities because online learning bridges the gap of distance, poverty, and limited course offerings in small schools. However, Watson (2005) cautions educators to carefully examine their distance education programs to ensure that the benefits match those of public schools, especially with regard to ensuring equitable access to all students. States must recognize and support distance education initiatives with policies and funding if future programs are to be sustainable and of high quality.

Overall, 21st century learning environments provide new opportunities for teachers to expand student learning opportunities by creating "global classrooms." They also use technology and media to address the diverse needs of students, to improve communication with students and parents, and to explore online learning options to better meet the individual learning requirements of students.

Figure 12.5

Virtual School Website

The Florida Virtual Schools website offers online students multiple resources such as a virtual library, information sessions, course tours, student clubs, and Facebook updates.

Source: www.flvs.net

TECHNOLOGY GRANTS FOR 21ST CENTURY LEARNING

Even though PK–12 access to technology is continually increasing, many teachers prefer to have a class set of computers rather than limiting student use to one or two days a week in the computer lab or bringing in a laptop cart. To solve this dilemma, districts, schools, and teachers apply for technology grants to provide hardware, software, and professional development to use the technology. Computers and other digital devices can also be acquired with grants focused on areas such as core content, social behavior improvement, and career training, if technology is integrated as a program component.

TYPES OF GRANTS

There are two basic types of technology grants: government grants funded at the federal, state, district, or school level and organization grants from businesses and corporations or nonprofit organizations such as foundations, groups, or associations.

Government Grants. The U.S. Department of Education's Office of Educational Technology and other departments offer several grant programs that are listed in the Federal Register of Education grants (http://www2.ed.gov/news/fedregister/announce/index.html). The grants range from statewide funding for longitudinal data systems to program-specific initiatives such as funding to improve the provision of assistive technology to individuals with disabilities. Of interest to districts, schools, and teachers are the "Enhancing Education Through Technology" or EETT grants, which are focused on improving elementary and secondary student achievement through the use of technology. Specifically, the EETT grant recipients are charged with meeting the following goals: (1) helping all students become technologically literate by the end of the eighth grade, (2) integrating technology into teacher training and core curriculum, and (3) establishing research-based instructional methods that can be widely implemented (US DOE Office of Educational Technology, 2010).

Government grants can provide substantial funding, but frequently require the submission of a lengthy, detailed proposal and budget; collaborative partnerships between districts, universities, and community organizations; and matching funds from the districts and partners. Thus, federal grants are normally awarded to districts or regions rather than to schools or teachers. However, the General Services Administration of the federal government sponsors the "Computers For Learning" (CFL) as a way to promote the reuse of government computers scheduled for replacement. The CFL program transfers excess computers and technology equipment to high-needs schools that complete the application and meet the program requirements (http://computersforlearning.gov).

Organization Grants. Grants from nongovernment organizations and foundations often involve a less extensive proposal process that is flexible enough to award funding to individual schools or teachers as well as to districts and collaborative partnerships. In addition, most schools can typically meet the requirements of grants sponsored by well-known organizations such as AT&T, Kellogg Foundation, and Cisco Systems Virtual Schoolhouse. However, please note that some grants have a very targeted focus. For example, the Lockheed Martin Corporation Philanthropy only funds K–16 science, technology, engineering, and math initiatives in schools located in communities where Lockheed Martin has employees.

Numerous websites provide lists of organizations that offer PK–12 technology grants. Examples include Top Teaching Resource (www.topteachingresources.com) and School-Grants (http://k12grants.org). The Fund$Raiser Cyberzone (www.fundsraiser.com) offers fundraising ideas, such as silent auctions, raffles, and donations. For further examples, see Free and Inexpensive Technology Grant Resources at the end of the chapter.

WRITING A GRANT PROPOSAL

Writing a successful grant proposal begins with a clear and structured process to describe how the funds will be used to achieve the overall purpose of the grant. It is critical to follow the specific guidelines in the Request for Proposal (RFP), as most proposals have a strict page limit and require information to be presented in a designated order. Many grants use an outline similar to the following:

- *Title page*. Select a title that is concise and clearly states the intent of the project. Avoid the use of clever or cute titles. Include the funder name and the names of the key people involved with the project.
- *Project Abstract*. Typically a one-page description of the project that includes overall goal/purpose, description of the project and how it will be implemented, who will benefit from the project, key staff, evaluation plans, overall costs, and timeline. Avoid overuse of academic jargon.
- *Statement of the Problem*. The intent of this section is to convince the funder that your proposed project will benefit students. Your argument should be supported with data and research. It is important to include data about your current situation by providing information such as the student-to-computer ratio and a description of student and teacher

needs. For example, will the project focus on students who are from low-income families, who are English language learners, or who have special learning needs—including providing advanced studies for gifted students? Show how your project will use research-based approaches to guarantee successful outcomes.

- *Project Description*. The project description includes the goals and outcomes, target population, methods, project staff, and timeline.
  - Goals and Outcomes. Begin this section with clearly stated goals and measurable outcomes that will be achieved at the end of the project.
  - Target Population. Describe who will benefit from the project. Include descriptions of the students by grade level and subject areas that will be emphasized and the teacher(s) who will implement the project.
  - Methods. Provide clear and concise descriptions of the methods that will be used to implement the project. How and what type of technology will be provided to the targeted population? How will teachers be prepared? How will the project change classroom practices and learning opportunities?
  - Project Staff. Most grants designate the lead project staff as the Principal Investigator or PI and secondary lead staff as Co-PIs. So begin your list with the PI and Co-PIs and then list other key staff: professional development facilitators, technology coaches, and technical assistants. It is not necessary to list those who provide accounting or secretarial support. Include names and a brief description of qualifications for the assigned roles of every staff member.
  - Timeline. Use a timeline to depict when each major activity will take place and the staff responsible for the activity. A table works well to display the information by using the following columns: Date, Activity, and Person(s) Responsible. It is sometimes helpful to outline how the project will continue in the future to demonstrate how you plan to sustain the project beyond the grant-funded time period.
- *Resources*. Describe the available resources that will be used to support the project (e.g., facilities, personnel, and equipment: printers, projectors, interactive whiteboards, etc.). Then describe resources that will be purchased with project funds. Include a rationale for each purchase.
- *Evaluation Plan*. Provide a clear description of the methods and procedures for evaluating the degree to which the project goals and outcomes have been met. Describe which participants will be included in the evaluation, the evaluation instruments to be used, how the results will be analyzed, and how the findings will be shared.
- *Appendices*. The RFP typically limits the appendices to specific types of content and number of pages. Common information in an appendix includes detailed descriptions of professional development models, example student work, data collection instruments, and staff curriculum vitas.

One way to improve technology grant proposals is to review past proposals submitted by your school or district, which often have descriptions of your student population and local setting that can be adapted for your proposal. It is also useful to review proposals submitted by other schools and districts, such as those provided by SchoolGrants (www.k12grants.org/samples/samples_index.htm).

SUMMARY

This chapter discusses the need to advance 21st century learning in our schools and describes how the ASSURE model can help teachers reach this goal. Specifically, today's teachers must integrate innovative uses of technology and media to implement and enrich 21st century learning environments. Teachers need to continually engage in professional growth activities, such as technology-focused professional development and national and local educational technology organizations. It is also important for teachers to stay informed of current research and technology grant opportunities that may increase student access to digital devices and resources. These combined efforts will not only benefit student learning, but also benefit our society by better preparing students to successfully contribute to the 21st century workforce.

CONTINUING MY PROFESSIONAL DEVELOPMENT

Demonstrating Professional Knowledge

1. Describe how the ASSURE model supports 21st century learning as described in the National Education Technology Plan.
2. Discuss the characteristics of a 21st century teacher who is technologically competent, information literate, and committed to professional growth and engagement.

3. List ways that 21st century environments use technology for inclusion, to connect schools and homes, and to offer the choice of online education.
4. Describe the types of technology grants available for 21st century learning and briefly explain the basic components included when writing a grant proposal.

Demonstrating Professional Skills

1. Review ASSURE lesson plans that you have developed or other technology integration lessons and describe how each lesson aligns with the NETP goals for learning and in what ways the lesson can be modified to address goals not included in the lesson. (ISTE NETS-T 2.A & 2.C)
2. Conduct a self-reflection to assess the ways in which you demonstrate technological competence and other traits of a 21st century teacher. Address the following questions in your self-assessment: What are your strengths and weaknesses in how you use technology to support your teaching? What are the strengths and weaknesses of how your students use technology and media to improve learning? How could you address the weaknesses? (ISTE NETS-T 5.C)
3. Interview two or more teachers who integrate various types of technology and media into their instruction or select two or more MyEducationKit videos of teacher interviews to learn how the teachers create 21st century learning environments. In a three- to five-page paper, compare and contrast how each teacher uses technology for inclusion or to interact with parents and what their thoughts are about using online learning as a learning option. (ISTE NETS-T 5.C)
4. Analyze the technology needs of the school in which you work or would like to work and locate a grant that would help the school address the identified needs. Use the grant proposal outline to write a brief description of how you would write each section of the proposal. (ISTE NETS-T 5.B)

Building My Professional Portfolio

- *Enhancing My Portfolio.* Select a technology integration lesson from MyEducationKit, the Web, or one that you have developed. After citing the source of the lesson, analyze it according to topics discussed in this chapter. Specifically, take note how or if the lesson addresses 21st century learning by examining: (1) use of technology and media for inclusion (e.g., ELL students, learning disabled and/or gifted students), (2) types of technology and media used to communicate outside the classroom, (3) types of technology skills required for the teacher and the student, and (4) how the lesson could be improved if grant funding provided students greater access to technology. (ISTE NETS-T 4.B & 5.C)
- *Reflecting on My Learning.* Reflect on the need to advance to 21st century teaching, as described in this chapter, and write a description of how you think this need will impact your teaching. What do you think will be the most rewarding aspects of 21st century teaching and why do you think so? List what you think will be the most challenging aspects and explain why. (ISTE NETS-T 2.A & 5.C)

SUGGESTED RESOURCES

Print

Andio, L. (2006). An observatory for e-learning technology standards. *Advanced Technology for Learning, 3*(2), 99–108.

Orey, M., Jones, S., & Branch, R. M. (Eds). (2010). Graduate programs in educational technology. Educational Media and Technology Yearbook *(35)*. New York: Springer.

Powell, A. (2006). Online support for teacher community of practice. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2006*, 2633–2638. Chesapeake, VA: AACE.

Reiser, R. A., & Dempsey, J. V. (2011). *Trends and issues in instructional design and technology* (3rd ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.

Schlager, M. S., & Fusco, J. (2004). Teacher professional development, technology, and communities of practice: Are we putting the cart before the horse? In S. Barab, R. Kling, and J. Gray (Eds.), *Designing virtual communities in the service of learning*. New York: Cambridge University Press.

Technology Grant News (2010). *Winning at IT: Grant writing for technology grants*. New York: Technology Grant News Publication.

Web Links

To easily access these web links from your browser, go to the MyEducationKit for your text, then go to Chapter 12 and click on the web links.

Discovery Education

http://education.discovery.com

Through its public service initiatives, products, and partnerships, Discovery Education reaches over 90,000 schools across the United States, serving 1.5 million teachers and their 35 million students each year. The site provides free lesson plans, *Kathy Schrock's Guide for Educators*, Teaching Tools, Curriculum Center, Brain Boosters, Clip Art, Puzzlemaker, Science Fair Central, Discovery Student Adventures, and more.

Edutopia

www.edutopia.org

Edutopia is a site supported by the George Lucas Educational Foundation (GLEF) that provides more than a hundred video segments of classroom practices and expert interviews, as well as free instructional modules that include articles, videos, blogs, PowerPoint presentations, discussion questions, and class activities. They draw from GLEF's archives of best practices and correlate with ISTE/NCATE NETS standards.

Eduscape

http://eduscapes.com

Eduscape, a site developed by Annette Lamb and Larry Johnson, includes multiple resources for teachers: 42eXplore—a weekly project section that contains multiple resources; Multimedia Seeds—ideas and resources to improve the use of multimedia; Teacher Tap—a professional development resource that helps teachers address common technology integration questions; and *Activate E-Journal*—a nonperiodic online publication with articles aimed at developing technology-rich learning environments.

National Center for Technology Innovation

www.nationaltechcenter.org

The National Center for Technology Innovation (NCTI), funded by the U.S. Office of Special Education Programs (OSEP), advances learning opportunities for individuals with disabilities by fostering technology innovation. The website provides resources and information to promote partnerships for the development of tools and applications by developers, manufacturers, producers, publishers, and researchers.

Study Guides and Strategies

www.studygs.net/index.htm

This is a public service site developed by Joseph Landsberger that provides study guides and strategies for multiple topics. Example topics are time management, problem solving, learning, learning with others, studying, classroom participation, online learning communication, thinking, memorizing, reading, research, project management, presenting projects, writing basics, taking tests, math, science and technology, and the teaching corner.

FREE & INEXPENSIVE
Class Websites

TeacherWeb

http://teacherWeb.com

A popular site that, for a nominal yearly fee, provides teachers a wide variety of tools to create an interactive class website. Sample tools include pages to post announcements, homework, links, teacher information, calendar, frequently asked questions, WebQuests, and teacher-created interactive tests.

Assign-A-Day

http://assignaday.4teachers.org

A free site hosted by 4Teachers that has an easy-to-personalize calendar for teachers to post homework assignments.

School Rack

www.schoolrack.com

An easy-to-use site that allows teachers to quickly set up a site that offers posting of digital files, assignments, parent notices, and more.

Class Homepage Builder

http://teacher.scholastic.com/homepagebuilder

This site provides tools for K–8 teachers to build a password-protected Class Homepage that offers space for recommending books, showcasing student work, communicating with parents, and archiving handouts. The site supports importing images and videos and the use of Google Calendar.

FREE & INEXPENSIVE

Technology Grant Resources

Funding Your Technology Dreams

www.cpsb.org/Scripts/abshire/grants.asp

Multiple listings of ongoing sources of technology grants, funding opportunities, and creative solutions to obtain technology resources for your class. The site also includes resources to help write grants.

Kathy Schrock's Grant Sources for Educators

http://school.discoveryeducation.com/schrockguide/business/grants.html

This site provides links to federal and foundation grant listings as well as tips for grant writing, how to locate grants on the Internet, and ideas for classrooms, schools, and districts to obtain technology funding.

SchoolGrants

www.schoolgrants.org

A variety of information and resources on grant writing, grant opportunities, and sample grant proposals. Also provided are newsletters and an index of links, including one for technology resources.

Foundation Center: Proposal Writing Short Course

http://foundationcenter.org/getstarted/tutorials/shortcourse/index.html

This short online course provides step-by-step guidance through the proposal writing process for grants funded by foundations and corporate donors.

Teacher Tap: Grants and Grant Writing

www.eduscapes.com/tap/topic94.htm

Professional development resources for teachers and librarians focused on grant resources starting points, exploring grant possibilities, getting started, identifying the need and your solution, goal setting, and writing a grant proposal.