Since the federal Act of NCLB (No Child Left Behind) of 2001 was passed, stricter certification, higher expectations, and hiring policies for new teachers have been implemented by school districts across the state. NCLB requires teachers to meet the criteria of “Highly Qualified Status” in subjects they will be teaching. Record numbers of teachers in the traditional content areas of reading, social studies, math, and science desire to obtain additional certification in the area of technology. An analysis of the newly required technology competencies of a number of states reveals that emphasis lies with “classroom applications” rather than basic “computer literacy.” Specifically, the areas of desktop publishing, audio, graphics, video, animations, multimedia creation, and Internet applications are now emphasized. Technology applications teachers also need to become familiar with ADA, assistive technology, diverse learning, ESL, digital divide, intellectual property, Internet security, and various ethical and social issues that involve the use of technology.

This study guide, written by faculty of a teacher preparation program, is designed to strengthen understanding of the critical information in the framework for technology application competencies for K-12 teachers.
Nationwide Demand

Many states now offer certification in the area of technology applications; however, very little preparation materials have been published to help teachers prepare for these exams. Many district technology administrators know that a host of certified teachers would like to pass new technology applications certification exams in order to teach computer-related courses.

This text can be used by preservice teachers enrolled in undergraduate computer literacy classes in teacher education programs. It may also aid professional development trainers for K-12 schools. It is believed that if preservice and in-service teachers receive instruction aligned to the new technology application competencies, they will better understand methods of integrating technology into classroom curriculum.

The authors anticipate that instruction in up-to-date technology competencies will aid preservice teachers enrolled in undergraduate programs better understand methods of integrating technology into the classroom curriculum. Instruction in up-to-date technology competencies will also help current teachers stay current with national trends in technology-assisted classrooms.

Keeping up-to-date with national and state technology competencies enables students to acquire the knowledge and skills needed to succeed in their chosen fields. Both preservice and in-service teachers need be highly competent in technology applications in order to enhance the opportunities for academic success for children and adolescents in inner-city schools. This is a critical time for faculty to update or retool their understanding of state technology requirement changes in order to ensure the “highly qualified” status required of all public school teachers.

Organization

The objectives of the book are aligned with National Educational Technology Standards for Teachers (NETS•T) for Teachers of International Society for Technology Education (ISTE). The organization of this text runs parallel with the sections and competencies of a number of states. The text is divided into four major sections. Each section covers one or more of the educator standards for this field. Within each section, the content is further defined by a set of competencies. The ISTE educator standards assessed within each section are listed for reference at the beginning of each chapter. These are followed by a list of key words, chapter content, and a number of sample questions testing the competencies.

The book is organized into 12 chapters. A brief description of the sections and chapters follows.
Section I

In Section I, Technology Applications Core (Chapters II through III), an overview of the technology-related concepts is presented, and the ethical practices for teachers about current technologies and their applications is discussed. Emphasis is placed on task-appropriate tools to synthesize knowledge, create and modify solutions, and evaluate results in a way that supports teachers’ work.

Chapter I, Technology Operation and Concepts for Teachers, introduces task-appropriate concepts and tools for teachers in order to synthesize knowledge in a way that supports the work of individuals and groups in problem-solving situations. Specifically, the chapter focuses on ways for teachers to plan, organize, deliver, and evaluate instruction for all students that incorporate the effective use of current technology for teaching and integrating national and state technology standards into the curriculum.

Emphasis is also placed on the use of computers to complete routine tasks faster and more efficiently.

Chapter II, Teacher Productivity and Professional Practices, focuses on the software tools that can be used in the classroom to enhance a teacher’s pedagogical productivity. In addition to word processing, other productivity tools such as electronic spreadsheets and database programs are also discussed. Emphasis is placed on helping the teacher use computers to increase classroom resources, thereby transforming the role of the teacher in the classroom.

Chapter III, Using Technology for Learning, Teaching, and Designing the Curriculum, discusses the essential conditions necessary to maximize student achievement in content areas.

Section II

Section II, Digital Graphics/Animation and Desktop Publishing, (Chapters IV through VI) introduces quantitative designs by discussing fundamental principles and applications of digital design. These chapters describe how desktop publishing and graphic design can be used in an education setting. Emphasis is placed on the basic principles of design that students and teachers should understand in order to help students with multimedia composition. The chapter also describes how to use technology to enhance students’ creative projects and reports by incorporating graphics and animation. This chapter also describes how students can apply this enhanced technological knowledge to a wide range of projects.

Chapter IV, The Principles and Applications of Digital Design, focuses on the various uses of graphics and animations in today’s classroom. Specific information is provided that details the use of digital cameras in schools. Specific examples of creative projects that incorporate graphics and photographs are also provided throughout the chapter.
Chapter V, Desktop Publishing for Schools, discusses how desktop publishing and graphic design can be used to enhance a document’s visual appeal. Emphasis is placed on desktop publishing, and how it enhances visual communication and streamlines the process of disseminating information of all kinds. Specific details are also given to explain how desktop publishing can be integrated into English language arts, social studies, science, math, music, and other content areas.

Chapter VI, Creating Multimedia for Special Audiences, focuses on the use of multimedia in the classroom. Emphasis is placed on the importance of defining an audience. This chapter also describes color theory, basic lighting, and design and composition principles. Special emphasis is placed on specific technical issues, such as monitor selection, that may affect media design.

Section III

Section III, Video Technology and Multimedia, (Chapters VII through IX) begins with an introduction to school multimedia design teams and project management. An overview of the use of video and sound in education is also provided within these chapters. Information within this section helps technology teachers obtain a broad understanding of multimedia authoring programs.

Chapter VII, School Multimedia Design Teams and Projects, introduces the major instructional design models used in education. This chapter identifies the different roles and responsibilities involved in developing projects. This chapter also provides a detailed scenario of the design and development processes of multimedia design projects. Specific emphasis is also placed on the differences of audio and video media from other productivity tools. The procedures, hardware, software, and the technical language used in audio/video media are also discussed. Emphasis is placed on incorporating music into video and multimedia projects with regard to the aesthetics of selection of music, copyright considerations, and building original music. Downloading music from the Web, specific software for cut and paste music editing, and programs that allow for the instant creation of royalty-free music in custom lengths are also discussed.

Chapter VIII, Video and Sound in Education, provides an overview of the use of video and sound in school projects.

Chapter IX, Design, Produce, and Distribute Educational Multimedia Products, helps technology teachers obtain a broad understanding of multimedia authoring programs, with specific emphasis on input/output devices, project dissemination, viewers or plug-in software for multimedia projects, general design principles, and evaluations of multimedia projects.
Section IV

Section IV, Webmastering, (Chapters X through XII) addresses Web-editing tools, Web site management, and communicating information in different formats for diverse audiences online. Emphasis is placed on the role of the technology teacher and the knowledge and skills needed to teach the foundations for Webmastering. Specific emphasis is also placed on information acquisition, solving problems, and communication. The national and state technology standards are also discussed within these chapters.

Chapter X, Administration of Educational Web Sites, discusses the Internet of the pre-Web age, the World Wide Web, and School Web Projects. Emphasis is placed on the role of the school district in developing a wide area network (or WAN) to serve as the “backbone” that connects all local area networks (or LANs) and computers across the various sites and campuses.

Chapter XI, Web Design Tools for Educators, presents basic information about the construction of Web pages using common Web design tools. The common formats found on Web browsers are also discussed. Typical formats include HTML, Web graphics, scripts, Web-compatible files such as PDF, audio, video, and animations. Routine Web-editing processes used to create or test Web pages are also discussed. Emphasis is also placed on student participation in Virtual Learning Communities (or VLC) in order to span distances and link with others with similar interests or areas of expertise. Use of the Internet for professional communication among teachers is also discussed.

Chapter XII, Web Communications and Interaction for Teaching and Learning, discusses ways for teachers to monitor student activities carefully, as well as how to infuse lessons with information about “safe” online practices for students.

Disclaimer

Many states offer tests that measure the content knowledge required of an entry-level educator in the field of technology applications in public schools. This book is designed to guide the examinee’s preparation by helping the test taker become familiar with the competencies to be tested, test item formats, and pertinent study resources. Educator preparation program staff may also find this information useful as they help examinees prepare for careers as educators.

When preparing for this test, emphasis should be placed on the competencies and descriptive statements, which delineate the content that is targeted for testing. A portion of the content is tested in the sample items that are included in this manual. These test questions represent only a sample of items. Thus, test preparation should focus on the complete content delineated for testing. There is no guarantee that the
contents of this book will completely prepare an examinee for all questions on the test. Readers should consult technology textbooks, articles, experts, and Web sites for updates, extra resources, and verifications of information.