

PREFACE

NEW TO THIS EDITION

The third edition of *Assistive Technology: Access for All Students* continues to provide both inservice and preservice educators with an introduction to and overview of assistive technology (AT). It is a resource and guide for training preservice and inservice teachers to meet the diverse needs of students with disabilities. In addition, the revision is relevant for those educators who are preparing students with disabilities to meet the challenges of both postsecondary education and employment opportunities. This revision includes the following:

- The openings of all chapters have been enhanced with the addition of Learning Outcomes and photos to create interest in the topic covered in each.
- The introductory chapter (Chapter 1) has been reorganized with updates of specific laws related to AT and expanded information related to sources of funding for AT.
- Inclusion of information on Common Core State Standards (Chapter 2) is integrated with UDL and RTI to explain how AT plays an important role in improving student learning.
- As the use of tablet computers and apps becomes mainstream technology, the authors have provided an evaluation tool (Chapter 3) for reviewing apps to determine their effectiveness and use as AT.
- The addition of a new chapter (Chapter 9) highlights the higher incidence of students on the autism spectrum and the need for AT for access, communication, and accommodations.
- Expanding information related to the use of AT in the adult world (Chapter 10) includes AT for learning in the postsecondary environment.
- Every chapter has been updated with the latest AT resources.

The third edition will benefit the reader by introducing and expanding the following premises:

- Educators now teach a wide range of students from very diverse backgrounds. It is important that educators know and understand laws and legislation that mandate AT in both the classroom and the workplace. Educators must differentiate instruction and understand how to accomplish this endeavor. AT is an essential and powerful way to meet the mandates of Common Core State Standards, RTI, and UDL.
- Educators must have an understanding of ethics as it applies to AT. They must understand various codes of ethics and how ethics relate to the use of AT, and that they are bound by these codes of conduct. Professional development is part of the commitment of the professional.
- Inservice and preservice educators must have a knowledge base of various types of adaptations to meet the unique needs of each student. Educators need to understand how to make these adaptations in every aspect of the student's life. AT is a means by which adaptations can be made for students.

The adaptations can begin at birth and continue through the adult years. This begins in the preschool setting and continues as students transition to postsecondary education and community living.

- Inservice and preservice educators must understand the various types of AT that are available to them, evaluate both the product and the need, and know how to locate and fund AT.
- Community-based services are essential for generalizing and applying classroom knowledge to the adult world. AT serves as an important tool in helping students with disabilities become successful adults.

ORGANIZATION OF THIS TEXT

This text is organized into ten chapters. Chapter 1 provides an introduction and overview of the laws that govern the use of AT and provides the reader with a synopsis of ethics as it applies to AT. Chapters 2 and 3 provide the learner with a foundation to understand and apply information from Chapters 4–10.

Special Features

ORGANIZING FEATURES Each chapter begins with Learning Outcomes and is enhanced with a photo. The Learning Outcomes enable the reader to activate prior knowledge as well as identify the topics covered in each chapter. A Chapter Review provides a summary at the conclusion of each chapter.

ASSISTIVE TECHNOLOGY SNAPSHOT Each chapter contains an in-depth snapshot of a real-life situation that relates to the use and understanding of AT. The AT Snapshot is referred to throughout each chapter as it relates to specific information.

ASSISTIVE TECHNOLOGY FOR STUDENT LEARNING The AT for Student Learning section connects AT directly to student learning. This section is specific and based on the information covered in the chapter.

ASSISTIVE TECHNOLOGY SPOTLIGHT This section of each chapter features AT that is applicable to the information covered in the chapter. This provides the reader with hands-on applications of AT.

MARGIN NOTES Each chapter contains notes in the margins that ask the reader to react to different types of situations. These notes provide the reader with an opportunity to apply what has been read.

DIVERSITY The topic of diversity is covered extensively throughout the text including working with students and families who are English language learners.

New! Pearson eText Available

To enhance affordability and portability this exciting new edition is available as a Pearson eText. With the eText students can easily take and share notes, highlight, and search for key concepts. To learn more about the Pearson eText, go to www.pearsonhighered.com/etextbooks.

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To Drs. Raymond Elliott, Tommy Russell, and Charlie Horne, who guided and mentored us through the doctoral program at The University of Alabama.

To all our teacher education candidates at our respective universities who instilled in us the importance of preparing all educators to work with a diverse student population.

I dedicate my efforts on this third edition to my late nephew Mason Lawrence Bowden McLendon (1992–2013) and to his grandparents Lawrence and Sara Bowden, who have demonstrated the extent that families will go to save someone they love. Mason loved technology and I think he felt less depressed and anxious when he was engaged in the use of technology. Thanking Jim, my husband, seems grossly inadequate. He is my encourager, supporter, and best friend. I wish to thank my colleagues and coauthors, Linda and Larry. As in the first two editions, the project has been a true collaborative effort. Both of you have proven to be dedicated, creative, knowledgeable, and committed. You are the best!

—*Laura Bowden Carpenter*

To my husband, Charles, who has been the anchor for me during our married life. He has encouraged me throughout the three editions of this AT book. To my daughter, Rebecca, who teaches students with special needs. She is one who keeps me grounded professionally. Finally to my two grandchildren, Emma Campbell and Liam Crawford, I dedicate my portion of this third edition to them. They are the future, for whom I work daily, to provide a great world for them to enjoy in their lifetime.

—*Linda B. Johnston*

First and foremost, let me try to express my sincere appreciation for my wife, Patricia Hill, who puts up with me and my projects on a daily basis. My two partners in crime, Laura and Linda, are two of the best colleagues and friends a person could have, especially on a project such as this. We have somehow remained friends through all three editions of this text. Also, let me acknowledge the reviewers who gave of their time and knowledge and are always appreciated, though not always recognized. And finally, to all of the students, past, present, and future, who we hope will benefit from this text.

—*Lawrence A. Beard*



1 | Assistive Technology

An Introduction and Overview

LEARNING OUTCOMES

- Define assistive technology devices and services.
- List provisions in federal legislation that establish current policies and practices related to assistive technology.
- Describe how the AT Continuum is used as a tool to evaluate devices and make decisions.
- Identify funding sources for obtaining AT devices and services.
- Apply ethical standards of practice in working with persons who use assistive technology.
- Explore reasons professionals must be continuous learners through participation in professional development opportunities.
- Analyze ways AT allows access and improved student outcomes in the general education curriculum.

Assistive Technology Snapshot

MEET ANNA SLOVIC, PAUL RAMIREZ, MARY O'DONALD,
YUN LEE, KATIE WYATT, AND ANN SHUMACK

Anna Slovic is a degree candidate enrolled at a local state-supported university. She is currently pursuing her degree in special education. As part of her teacher preparation program, Ms. Slovic must take a course in assistive technology (AT). She has just been admitted into the professional education program and has taken the introductory special education course. She knows a little about assistive technology, but she knows that there is much more to learn about how assistive technology services and devices support learning in the general education curriculum for students with disabilities.

This is Paul Ramirez's first year as the instructional leader of Garcia Elementary School. He attended many professional development events to prepare for this position. Mr. Ramirez understands the purpose of instructional technology in improving student outcomes. However, one area that he feels he must learn more about is the assistive technology that many of the students in his school use to be successful learners. More experienced instructional leaders have warned him that assistive technology is costly and often unnecessary.

Mary O'Donald has been a special educator for 23 years. For the past three years, she has taught learning strategies to students with mild disabilities in her resource classroom. The district special education director met with her and discussed the possibility of Ms. O'Donald expanding her role to that of a consulting teacher for three students who are included in general education classes. Each of these students relies on assistive technology for access and support in class. Ms. O'Donald has tried to keep up with current technology, but she is not confident that she has

the knowledge and skills to support the students' use of assistive technology.

Yun Lee teaches world history at SeaView High School. He loves his job and cares deeply about the well-being and education of all his students. He was invited to attend the Individualized Education Program (IEP) meeting for a student who will be in his class next fall. During the meeting, he was asked to explain the types of teaching and learning activities that he requires for his course. Then the IEP team determined what kinds of assistive technology the student might need to be a successful learner in world history. Mr. Lee wishes to remain optimistic about how he can meet the academic needs of the student, but he knows he has limited experience with and very little knowledge about assistive technology.

Katie Wyatt is a professional rehabilitation counselor. Her job includes assisting students with disabilities in making the transition from school to the adult world. She has been working recently with a student who wishes to go to college. The student uses a wheelchair and requires technology for communication. Ms. Wyatt needs to know what kinds of expectations the student will meet in the postsecondary environment and what types of support the student will need to be successful. She wants the student to be prepared to make a successful transition.

Ann Shumack is the technology coordinator for the Valley Shades City School District. She is well prepared for her role in coordinating equipment, resources, and professional training in how to use technology as an instructional tool for engaging students and promoting learning within the district. However, Dr. Shumack is fielding more and more requests from

instructional leaders and faculty for expertise in the use of assistive technology.

These professionals all have something in common: they need to know more about assistive technology. They should begin by learning how to define assistive technology and by understanding

the laws that provide for it as well as the ethical standards of practice that support professionals. This and subsequent chapters describe what professionals must know about assistive technology to provide services and successful learning opportunities for students with disabilities.

INTRODUCTION TO ASSISTIVE TECHNOLOGY

Today the challenges of teaching a diverse student population are at the forefront of all education initiatives. At no other time have all students had such an opportunity to be educated by a team of professionals in an inclusive setting. Students with disabilities, English language learners (ELL), students at risk for school failure, and students who are gifted now have the opportunity to learn from one another in inclusive educational settings. Many students have benefited from inclusive settings that boast of well-prepared and caring teachers, effective strategies, and appropriate resources to meet their needs. For some, however, the road has been a journey of trials, discrimination, and even some errors.

Educators now have the opportunity to individualize instruction with many technological devices never before available in education. Many teachers have these devices available to them in their own classrooms. Not only instructional technology but also assistive technology (AT) can be customized to meet the needs of students with disabilities. Although AT is widely used to ensure that students with disabilities may participate in the general education curriculum, AT can also be used with ELL, students at risk, and students considered to be gifted. AT can open a new world for students in inclusive settings, as well as for adults throughout the life span. AT makes it possible for students with disabilities to access the general education curriculum and be successful learners. Many professionals seek a merging of instructional technology with AT to make learning accessible and reach a diverse student population (Cavanaugh, 2007).

Assistive Technology Defined

To understand AT, we must first define the term and understand how it evolved for students with disabilities. *Assistive technology* as we know it today evolved from the definition in the Technology-Related Assistance for Individuals with Disabilities Act (Tech Act) of 1988 (Public Law 100-407). **Assistive technology** is an item or piece of equipment or product system acquired commercially, off the shelf, modified, or customized, and used to increase, maintain, or improve functional capability for an individual with disabilities.

What are the components of the AT definition?

LAWS AND ASSISTIVE TECHNOLOGY

The Technology-Related Assistance for Individuals with Disabilities Act of 1988

Better known as the Tech Act of 1988, the Technology-Related Assistance for Individuals with Disabilities Act (P.L. 100-407) was signed into law by President Ronald Reagan. This law provided funding for states to develop consumer

FIGURE 1-1 Assistive Technology Services

1. Evaluating the needs of individuals with disabilities for AT devices.
2. Purchasing, leasing, or providing for the use of AT devices by individuals with disabilities.
3. Selecting, designing, customizing, applying, and maintaining AT devices.
4. Coordinating and using other therapies and services with AT devices.
5. Training and technical assistance for individuals with disabilities.
6. Training or technical assistance for professionals.

Source: Adapted from U.S. Congress (1988).

information and training programs that were designed to meet the needs related to assistive technology of individuals with disabilities. The act defined two different areas related to AT and delineated *assistive technology services* and *assistive technology devices*. An **assistive technology service** is any service that directly assists an individual with a disability in the selection, acquisition, or use of an AT device. An **assistive technology device** is any piece of equipment or product system, whether acquired commercially, off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (U.S. Congress, 1988). The latter still is used frequently for educational purposes. To clarify the term *AT services*, the Tech Act outlined AT services within the law (see Figure 1-1).

Under this law, grants were provided to states to support systems change and advocacy activities related to statewide programs of technology-related assistance for individuals with disabilities. The Tech Act of 1988 was a monumental mandate because it was the first law that actually provided a venue for the use of AT devices. In 1994, the Tech Act was amended (P.L. 103-218) to revise and extend programs of the Technology-Related Assistance for Individuals with Disabilities Act of 1988 and for other purposes.

Telecommunications Act of 1996

President Bill Clinton signed a major reform of telecommunications legislation on February 8, 1996. The Telecommunications Act of 1996 (P.L. 104-104) provided benefits to all citizens as it related to the information superhighway that carried the United States into the twenty-first century. The act contained provisions that opened the doors to connect all classrooms to the information superhighway by 2000. It also provided provisions for libraries to be connected. Accessibility guidelines related to this act were published in the *Federal Register* in 1998. In part, the accessibility guidelines provided for accessibility, usability, and compatibility of telecommunications equipment covered by the Telecommunications Act. The guidelines specifically provided the requirements for accessibility, usability, and compatibility of new products and those products in existence that needed changes or upgrades to improve functionality. This legislation and the ensuing guidelines provided a foundation for ensuring that the information superhighway become accessible to all individuals.

REVIEW

FIGURE 1-1.

How might a student's IEP team find this information useful in planning for AT?

Carl D. Perkins Vocational and Technical Education Act of 1998

The Carl D. Perkins Vocational and Technical Education Act (P.L. 101-392), better known as the Perkins Act, was first authorized in 1984. In 1998, the act was reauthorized and provided individuals with academic and technical skills for success in a knowledge and skills economy. Some of the activities supported by the Perkins Act include access to career and technical education for students with disabilities and the purchase of equipment to ensure access to the latest technology. Funds provided by the Perkins Act are allocated to both secondary and postsecondary schools (Association for Career and Technical Education, 2005).

Assistive Technology Act of 1998

The Tech Act officially ended in 1998 with the passage of the Assistive Technology Act (P.L. 105-394) signed into law by President Bill Clinton. The purpose of the act was to support programs and grants to states to help them address the technology needs of individuals with disabilities. The Assistive Technology Act consisted of four sections:

- Title I* State Grant Programs;
 - Title II* National Activities;
 - Title III* Alternative Financing Mechanism;
 - Title IV* Repeal and Conforming Amendments.
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- Title I* Designed the awarding of grants to states to support capacity-building and advocacy activities. These grants were designed to provide assistance to states in the maintenance of comprehensive statewide programs of technology-related assistance.
 - Title II* Provided for the coordinated effort in research related to AT that incorporates principles of Universal Design for Learning (UDL).
 - Title III* Provided grants to states to help pay for the federal share of costs related to the establishment, administration, or expansion related to alternative financing for AT systems for individuals with disabilities.
 - Title IV* Repealed the Tech Act of 1988 (1998 Amendment to Section 508 of the Rehabilitation Act).

Federal mandates have specifically addressed AT during the past two decades. However, it is important to remember that support for students to gain access to general education was mandated as early as 1973 in federal legislation.

Assistive Technology Act of 2004

The Assistive Technology Act of 2004 (P.L. 108-364) redirected funding to individuals by providing direct aid to individuals with disabilities. The reauthorization of the Assistive Technology Act of 2004 redefined the purpose of the Assistive Technology Act of 1988, which helped states develop the infrastructure to get assistive technology to individuals. Due to the reauthorization, the focus of the law became delivering AT to persons with disabilities rather than

developing the delivery structures. Under this act, states can use 60 percent of AT state grants on direct-aid programs, including AT reutilization programs, AT demonstration programs, alternative financing programs, and device loan programs. States may also choose to use 70 percent of the state AT grants on direct-aid programs and may have full discretion when allocating funds for at least two and up to all four of the programs cited. The Assistive Technology Act of 2004 also created greater accountability for how states use AT grants and requires that states continually evaluate the effectiveness of programs. Millions of Americans with disabilities depend on AT to function in their daily lives. The federal government has established funding through the Assistive Technology Act to help individuals with disabilities gain access to technology.

Education for All Handicapped Children Act of 1975

Public Law 94-142, the Education for All Handicapped Children Act (EHA), was signed into law on November 29, 1975. This landmark legislation changed education for school-age children with disabilities. The act ensured that all students with disabilities had access to a **Free Appropriate Public Education (FAPE)**, which ensures that all children with disabilities have available special education and related services to meet their unique needs. The law further stated that the Individualized Education Program (IEP) would contain a statement of specific education services provided to the student and the extent to which the student would be involved in the general education program. The services and participation in the general education program have evolved a great deal since passage of this law. In 1975, educators were creating their own devices to help students be successful in the general education setting. These supports would later be known as AT.

In 1986, the EHA was reauthorized (P.L. 99-457) and added services for infants, toddlers, and their families. The Individualized Family Services Plan (IFSP) was included in this reauthorization and opened the door for infants and preschool children to begin receiving services and utilizing AT devices. These early devices were primarily the light-tech type, as described by Vanderheiden (1984) and which will be defined and discussed throughout this text. These devices enhanced students' opportunities to be educated with their peers in the general education classroom and to learn valuable skills.

Individuals with Disabilities Education Act of 1990

The legislation continued in 1990 when the EHA was again reauthorized, with its name changed to the Individuals with Disabilities Education Act (IDEA) (P.L. 101-476). In this revision the Individual Transition Plan was added and became part of the student's IEP. As part of the IEP update, a transition plan is designed for each student with a disability. AT devices must be a consideration for the transition plan and must be provided if the IEP team considers it necessary and appropriate for the student's success as a learner. Transition and AT are discussed further in Chapter 10.

The 1990 IDEA amendments added autism and traumatic brain injury as disability categories. As more students were determined eligible in these categories, support and related services became important components of the IEP.

Individuals with Disabilities Education Act of 1997

The IDEA was reauthorized in 1997 (P.L. 105-17). IDEA (1997) stressed **Positive Behavioral Intervention Supports (PBIS)** as a means for addressing issues related to student behavior and how behavior is related to learning. The IDEA also addressed the participation of students with disabilities in district and state testing and the general education curriculum. These three major additions to the law provided impetus for the use of appropriate AT devices.

The changes that occurred with the 1997 amendments made it very clear for educators that students with disabilities were to be educated with their peers. These changes resulted in colleges and universities preparing preservice educators to work with a more diverse group of students. General educators were taught strategies to support students with disabilities in the general education classroom. The use of AT services and devices became widespread. Educators wanted and continue to seek professional development related to AT. As illustrated in the Assistive Technology Snapshot at the beginning of this chapter, educators find themselves in the role of planning and delivering services for all students. Thus the need for knowledge regarding AT continues to grow, and it is critical that educators have the opportunity to participate in professional development opportunities that support that need. More about professional responsibilities can be found later in this chapter.

Individuals with Disabilities Education Improvement Act of 2004

In 2004, IDEA was reauthorized. The Individuals with Disabilities Education Improvement Act of 2004 (P.L. 108-446) added to the definition of AT. The original definition of AT, as defined in the Tech Act of 1988, remained basically unchanged except for the clarification that the term does not include surgically implanted medical devices or replacement of such devices. According to Mandlawitz (2005), this addition resulted over the concern that school districts may be held accountable for the provision of cochlear implants for children with hearing impairments. Cochlear implants are discussed in detail in Chapter 8.

In addition, the term *Universal Design for Learning* was introduced. Although addressed in other legislation, this was the first time it appeared in the amendments of special education law. The definition was derived from the meaning found in Section 3 of the Assistive Technology Act of 1998. **Universal Design for Learning (UDL)** is a concept or philosophy for designing and delivering products and services that are usable by people with the widest range of functional capabilities and that include products and services that are directly usable (without requiring assistive technology) and products and services that are made usable with assistive technology (Sec. 602[35]). The law requires that states and school districts develop and administer assessments, to the maximum extent possible, using UDL principles (Mandlawitz, 2005). Both the use of AT and the concept of UDL must be considerations addressed by the student's IEP team. More about UDL and its relationship with AT is found in Chapter 2. The details of the collaborative team processes are found in Chapter 3.

Section 504 of the Rehabilitation Act of 1973

Two significant pieces of legislation that are critical in understanding AT are both civil rights legislation for individuals with disabilities. These were passed almost two decades apart—however, both made significant contributions in support of the success of individuals with disabilities. The first, Section 504 of the Rehabilitation Act of 1973 (PL 93-112), required that reasonable access be provided for all individuals with disabilities. This law affected both the public schools and the general population outside school buildings: it guaranteed public access to all public buildings. Access had to be made for individuals with disabilities both in schools and in the broader public sector. Prior to this, most legislation addressed only school-age children. Section 504 extended the law to the entire workforce. Today many individuals believe that this law set the tone and foundation for both IDEA and the Americans with Disabilities Act.

Americans with Disabilities Act of 1990

On July 26, 1990, President George H. W. Bush signed into law the Americans with Disabilities Act (ADA; PL 101-336). This act prohibited discrimination in employment and in transportation, and it provided access for public accommodations and telecommunications. The ADA Amendments Act of 2008 (PL 110-325) became effective on January 1, 2009. These amendments make minor changes in the language and definitions; however, the major intent and provisions of the original law remained intact.

The ADA also implemented the concept of normalization. ADA guaranteed access in the employment sector for individuals with disabilities and also prohibited discrimination in the workplace against individuals with disabilities. The ADA required that telephone companies provide relay services for individuals who are deaf and those with speech impairments so that they may use telecommunication services. These are described in Chapter 8.

The Elementary and Secondary Education Act

The No Child Left Behind Act (NCLB, PL 107-110) was passed into law on January 8, 2002. It is the reauthorization of the Elementary and Secondary Education Act of 1965 (PL 89-10), which is the primary federal law affecting education from kindergarten through high school. Although not a law that focuses primarily on AT, the four principles of the NCLB do affect students with disabilities. These four principles—(a) accountability for results, (b) more options for parents, (c) greater local control of and flexibility in the use of federal funds, and (d) an emphasis on using best practices based on scientific research—have thrust students with disabilities into the mainstream of general education in greater numbers. The Individuals with Disabilities Education Improvement Act of 2004 is aligned with NCLB to provide increased support and improved outcomes for students with disabilities. Because students with disabilities are expected to become proficient in subject matter, AT will provide access for them to be successful learners in the general education classroom.

In 2012, the Obama administration initiated a request to reauthorize The Elementary and Secondary Education Act of 2002 (U.S. Department of Education, 2013). The key components of the request continue to address meeting the needs of diverse students by providing intensive supports and effective interventions. At the time of press, Congress had not passed a reauthorization.

Federal legislation has served to protect and provide equal access for individuals with disabilities. Through the passage of many laws, all individuals are now on an equal basis. Through the use of AT devices, individuals with disabilities can now lead productive, independent lives, which was not possible in the past. The ESEA is scheduled to be reauthorized by the 113th Congress. The Council for Exceptional Children (2009) recommended that the reauthorization carefully balance the major components with the Individuals with Disabilities Education Improvement Act so that the rights of persons with disabilities are protected.

Technology can support students as they strive to become successful learners. Education is a lifelong process that begins at birth and continues through the lifespan of an individual. AT can empower individuals with disabilities to access, acquire, and accept new opportunities. Understanding the legislation that has shaped the field of AT allows professionals to form a solid knowledge base that can be applied in practice. Table 1-1 provides additional resources related to legislation and AT.

TABLE 1-1 Web Resources for Assistive Technology Laws	
Assistive Technology Legislation http://atto.buffalo.edu/registered/ATBasics/Foundation/Laws/atlegislation.php	Summary of current laws and legislation.
1998 Amendment to Section 508 of the Rehabilitation Act http://www.section508.gov	Provides Section 508 information and guidance. Multiple links including a summary of the law.
Individuals with Disabilities Education Improvement Act of 2004 http://idea.ed.gov/explore/home	Resources and information about this act.
Americans with Disabilities Act http://www.ada.gov	Information and technical assistance regarding the Americans with Disabilities Act as well as the ADA Amendments Act of 2008.
Section 504 of the Rehabilitation Act of 1973 http://www.section508.gov/index.cfm?FuseAction=Content&ID=15	Summary of Section 504.
No Child Left Behind Act of 2002 http://www2.ed.gov/nclb/landing.jhtml	Summary of the law with informative links.
Assistive Technology Act of 2004 http://www.ataporg.org	The Association of Assistive Technology Act Programs (ATAP) is a national, member-based organization comprised of state Assistive Technology Act programs funded under the Assistive Technology Act (AT Act). Highlights Tech Act Projects.

THE ASSISTIVE TECHNOLOGY CONTINUUM

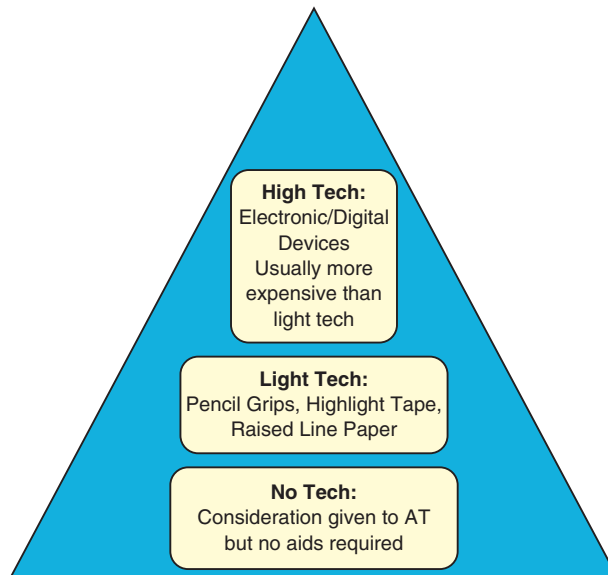
Technology does not have to be sophisticated and expensive to be effective. The Individuals with Disabilities Education Improvement Act of 2004 defines technology in a broad sense to include the range of very sophisticated high-tech innovations to the simplest, everyday, light-tech devices. The selection of devices must be a careful and well-thought-out process. Just as it may be harmful to the student to select an inappropriate device, it may be harmful to select a device when one is not needed. Assessing the needs of the individual student improves the chances that the correct device will be used to improve student outcomes. AT assessment should determine what combination of specific technology and services would best meet the needs of the individual student. Chapter 3 describes more about AT assessment.

One effective method of visualizing and understanding the range of the various types of AT is to think of AT on a continuum (see Figure 1-2). This continuum provides a range of consideration for AT devices varying from no tech to light tech, to high tech. These terms were first described by Vanderheiden (1984). Assistive Technology Spotlight 1-1 in this chapter features the AT Continuum.

No Tech

Professionals must be careful not to fall into the trap of the so-called technological imperative. Just because something exists does not mean it must be used. The focus of AT is on the student and the student's current individual needs, not on the device or the student's needs in the near or distant future. If the student is not ready to use a device or cannot at the present time use a device, frustration can develop that may lead to AT abandonment. The team must take the time to consider carefully how the student may benefit from an AT device and whether the task can be accomplished successfully without the use of technology. Valid

FIGURE 1-2 The Assistive Technology Continuum



and reliable assessment is critical in determining whether a device is needed. Chapter 3 provides more information on assessment.

Light Tech

You are most familiar with this type of technology because you have used it yourself. All those gadgets, gizmos, thingamajigs, doohickeys, and other items with colorful names are considered light tech. Regardless of what we call them, they are simple tools that make life's daily activities easier, or in some cases, possible.

Light-tech AT devices are generally nonelectronic and relatively inexpensive. They may be as simple as pencil grips to help students with fine-motor problems grip pencils properly, magnifying glasses to enlarge print or special paper with raised lines for the visually impaired, or eating utensils adapted to help a student self-feed. Light-tech devices are simple to use and should be considered after the no-tech devices in the continuum.

High Tech

High-tech devices are generally electronic, are usually tied to a power supply, and typically require careful planning so that they are not too intrusive. A cost factor usually must be considered. Some examples of high-tech devices are a wheelchair that climbs stairs and a laser cane for people who are blind. A great deal of computer hardware and software also provides screen magnification, synthesized speech, tactile display, or combinations of these. Talking scales, talking glucometers, talking clocks, color identifiers, talking compasses, and other devices that allow for speech output can also be used. Some students with disabilities must have high-tech devices to be successful learners.

Cost should not be a consideration in providing the type of AT a student with a disability needs for access to the general education curriculum. Thus, identifying resources for possible funding for AT is a critical professional skill.

FUNDING FOR ASSISTIVE TECHNOLOGY

Funding for AT is often fraught with contention if families are at odds with the school in the provision of needed AT. The best results can be achieved by a spirit of collaboration. A proactive strategy that promotes collaboration is one in which the team develops a funding strategy. Devices vary in cost from inexpensive for light-tech devices (such as pencil grips or special paper) to very expensive for high-tech devices. After first determining that a student would benefit from AT and then identifying the type of devices a student may need, funding may become an issue. It is then crucial for the team to confirm that the student will need the AT to access the general education curriculum and to be a successful learner. Again, this emphasizes the importance of accurate AT assessment and knowledge of the AT Continuum.

For students who are eligible for special education services under one of the 13 disability categories defined by the Individuals with Disabilities Education Improvement Act, it is the responsibility of the local school district to pay for any AT device or service included in the student's IEP. For AT that may serve more of

Give an example of a no-tech, light-tech, and high-tech device related to a content area.

a medical need than an educational one, Medicare, Medicaid, and private insurance may help finance technologies prescribed by a physician or a related service professional, such as a speech–language pathologist or an occupational therapist. AT for vocational success is all about helping the student enter the workforce and maintain a job. Using the correct terminology enables the team to determine the correct funding source.

Although resources (other than the local education agency) for affordable AT may be limited, families and schools should consider other sources, such as special needs libraries, lending libraries, disability organizations, voluntary organizations such as church groups and service clubs, local businesses and vendors, and families and friends. Table 1-2 lists sources for AT funding.

Professionals and families working with students with disabilities making the transition to a postsecondary setting should be aware of sources for AT and how to access the resources. This is important once the student has moved to a postsecondary school. Section 504 of the Rehabilitation Act of 1973 requires that the postsecondary school provide AT devices as a reasonable accommodation so that the student has full access to the institution of higher learning. In addition, some state departments of vocational rehabilitation may provide AT funding for their clients.

TABLE 1-2 Funding Assistive Technology

ATIA http://www.atia.org/i4a/pages/index.cfm?pageid=4219	Assistive Technology Industry Association Assistive Technology Resources Guide Information about multiple funding sources including grant opportunities.
ATSTAR http://www.atstar.org/atinfo/funding.htm	Assistive Technology Strategies Tools Accommodations and Resources Question-and-answer format addresses funding issues.
The Alliance for Technology Access http://www.ataccess.org http://www.ataccess.org/resources/lowcostnocost/LowCostNoCostATAguide.pdf	The alliance is a national network of AT resource centers, individual and organizational associates, and technology vendors and developers. Includes a <i>Guide to Low-Cost / No-Cost Online Tools for People with Disabilities</i> .
United Cerebral Palsy http://www.ucp.org/resources/one-stop-resource-guide#Services	<i>One Stop Resource Guide</i> with resources for financial assistance.
Volunteer and Charitable Organizations http://www.elks.org/lodges/default.cfm http://www.easterseals.com http://www.lionsclubs.org	Lions Club, Elks Club, Easter Seals, church groups, and local charitable organizations may provide support to purchase technologies.
Funding Source for Computers http://www.givetech.org/	Funds from Give Tech may be available for persons with severe disabilities.

AT can be costly. However, the bottom line is that the local education agency has a legal obligation to provide the AT devices and services stated in a student's IEP. It is important for the school and family to work together to make sure the AT device is what the student needs to be a successful learner. Professionals must understand their roles and responsibilities in ensuring that students with disabilities receive the AT devices and services they need. Conflicts can arise between stakeholders. It is critical for every professional to adhere to the ethical standards of practice for educators when making decisions regarding AT for students with disabilities.

ASSISTIVE TECHNOLOGY AND ETHICAL STANDARDS OF PRACTICE

Classrooms are becoming more diverse as students with disabilities are included for access to the general education curriculum. Educators who find themselves teaching students with disabilities are faced with complex conflicts, challenges, and issues. The solutions for these may be found within professional organizations that support teachers. Such organizations define and expand on a code of ethics and professional standards of practice that serve as guides for ethical practice.

Ethics

The area of AT has grown immensely within the last decade. Professionals involved in the assessment and planning process for AT services and devices for students with disabilities generally adhere to the standard code of ethics for their profession. **Ethics** is defined broadly as standards of conduct related to a specific profession. For special educators, the Council for Exceptional Children (2010) Code of Ethics applies; for speech-language pathologists, the American Speech and Hearing Association Code of Ethics applies. Most states have now adopted professional ethics and standards of practice for all educators. Readers are directed to each state department of education for more information for particular states. All professionals should be members of their professional organization.

None of us would like to use the services of any professional who does not subscribe to and adhere to the professional code of ethics and standards of practice created by and for members of the profession and based on extensive research and dialogue among professionals in the field, and which are often evolving as the field advances. Professional standards take into consideration the legal and ethical aspects of practice. When a person enters a profession, he or she is expected to follow the ethical standards of practice developed by his or her professional organization. As more and more general education teachers find themselves teaching students with disabilities, it becomes a necessity for them to understand and adhere to the ethical standards developed for teachers who work with students with exceptionalities.

Rehabilitation Engineering and Assistive Technology Society of North America

The use of AT by students with disabilities in the general education classroom has grown. Due to the increasing number of students who use AT devices, the

Rehabilitation Engineering and Assistive Technology Society of North America (RESNA, 2005) has adopted a mission statement and code of ethics for AT.

RESNA is an interdisciplinary association for the advancement of rehabilitation and AT. Table 1-3 describes RESNA and other professional organizations. The RESNA mission statement and code of ethics are specific to AT. While many professions are represented by their own codes of ethics, the RESNA mission statement and code of ethics guide the optimal standards for AT providers.

Webquest 1.1

To see the CEC Code of Ethics, go to <http://www.cec.sped.org/Standards/Ethical-Principles-and-Practice-Standards>.

The Council for Exceptional Children

Students with disabilities are, by their very nature, vulnerable. They have been historically discriminated against and have received below-standard educational services. To prevent further discrimination and to support high standards of

TABLE 1-3 Professional Organizations Related to Assistive Technology

Council for Exceptional Children (CEC) http://www.cec.sped.org/	CEC is the largest international professional organization dedicated to improving educational outcomes for individuals with exceptionalities, students with disabilities, and the gifted. CEC sets professional standards, provides continual professional development, advocates for newly and historically underserved individuals with exceptionalities, and helps professionals obtain conditions and resources necessary for effective professional practice.
The Technology and Media (TAM) Division of the Council for Exceptional Children http://www.tamcec.org	TAM is the official division of CEC that works to promote the availability and effective use of technology and media for individuals with disabilities and/or who are gifted.
International Society for Technology in Education (ISTE) http://www.iste.org	ISTE provides leadership and service to improve teaching and learning by advancing the effective use of technology in education.
The International Technology Education Association (ITEA) http://www.iteaconnect.org	ITEA is the largest professional educational association, principal voice, and information clearinghouse devoted to enhancing technology education through technology, innovation, design, and engineering experiences at the K–12 school levels. Its membership includes individuals and institutions throughout the world in more than 45 countries, with the primary membership in North America.
Rehabilitation and Engineering Assistive Technology Society of North America (RESNA) http://www.resna.org	RESNA is an interdisciplinary association of people with a common interest in technology and disability. Its purpose is to improve the potential of people with disabilities to achieve their goals through the use of technology. The organization serves that purpose by promoting research, development, education, advocacy, and provision of technology, and by supporting the people engaged in these activities.

educational services, the Council for Exceptional Children (CEC) has a code of ethics for educators of persons with exceptionalities.

The CEC was organized in 1922 by a group of professionals interested in the education of persons with disabilities. Since that time, the CEC has grown to be the largest international professional organization dedicated to improving educational outcomes for individuals with exceptionalities. The organization advocates for appropriate governmental policies, sets professional standards, and provides opportunities for professional development. In addition, CEC advocates for newly and historically underserved individuals with exceptionalities and helps professionals obtain conditions and resources necessary for effective professional practice (Council for Exceptional Children, 2008). The CEC code of ethics and standards of practice may be accessed through the CEC website (see Table 1-3). Parts of the CEC code of ethics and standards of practice will be integrated and explained in other parts of this chapter.

Why would general education teachers need to understand the ethical standards of professionals who work with students with disabilities?

Webquest 1.2

To see the National Education Association (NEA) Code of Ethics, go to <http://www.nea.org/home/30442.htm>.

Professional Ethics and Special Education

Ethics can be defined simply as doing what is right. However, ethics must be considered from all aspects. As educators, we must look at doing what is right and we must have a solid understanding of what technology can and will do for the student.

Along with the concept of “Can we do this for the student?” educators must consider the question “Should we do this for the student?” We must examine the consequences of our actions on the student, the school, and the environment in which the student must function (Vertrees, Beard, & Parnell, 1997).

Assistive Technology Considerations and Ethics

The IEP team must consider who is going to train the personnel (not just the students) in the appropriate use of the AT. It is the responsibility of the IEP team to ensure that everyone involved follows ethical standards of practice when making AT decisions and implementing AT devices and services. All professionals involved in this process are expected to adhere to the code of ethics set by their professional organizations. The IEP team may suggest that teachers and service providers undergo professional development to be able to use AT effectively.

PROFESSIONAL DEVELOPMENT

Technology is a rapidly growing, changing, and expanding field. It remains a significant challenge for professional educators to obtain the knowledge and skills related to the newest technology. The field of AT is no different from other areas of technology. Professional educators can stay current in technology by engaging in meaningful and purposeful professional development that allows the professional to pursue a program of continuing education. These opportunities advance knowledge and skills so the professional educator can maintain a high level of competence. This advancement allows the professional educator to respond to the changing needs of persons with exceptionalities (Council for Exceptional Children, 2010).

Professionals can advance their knowledge and skills in many ways. Most school districts provide inservice opportunities, which can be powerful opportunities for learning if they adequately address the professional needs of the educator. For those educators who need specialized training, professional conferences and topical workshops are provided by professional organizations. For example, RESNA provides a variety of online courses, programs, and electronic-based information, as well as an annual conference, to facilitate the skills of those who work with persons who use AT. Table 1-3 lists other professional organizations that provide similar resources for professionals who need to know more about AT services and devices.

Professional Publications

Another resource for educators wishing to advance their knowledge base and skills in the field of AT is the professional literature available on this subject. Professional journals are found in a variety of formats—including electronic, print, and CD-ROM. The electronic journals may be obtained through library databases and the Internet. Most professional organizations in the field of AT publish professional literature, and most of it is available electronically. One of the benefits of belonging to a professional organization is the opportunity to receive professional publications as part of membership. For example, RESNA publishes a journal for professionals involved in the application of AT and rehabilitation technologies and the delivery of related services. The Technology and Media (TAM) division of the CEC also publishes a journal and a newsletter providing professionals with information on new technologies, current research, best practices, relevant issues, and national political events.

Professional Organizations

Teachers are responsible for joining and participating in professional organizations that advocate for the profession of teaching, for improving student outcomes, and for advancing professional growth. Most organizations of teachers define ethical standards of exemplary professional practice. Teachers who find they are teaching students who learn differently and need AT to access the general education curriculum should identify those professional organizations that provide standards for practice and resources for teachers using AT. Table 1-3 lists professional organizations of interest.

Planning for Professional Development

Teachers need a systematic and effective method of planning professional development opportunities. One suggestion for structuring such a development plan is to engage in a self-assessment activity. Using standards of best practice provided by professional organizations may provide a method of self-assessment. Assistive Technology Spotlight 1-2 (found later in this chapter) provides a method using the top 10 skills required for being proficient in assistive technology. The professional rates him- or herself as “novice” or “proficient” in each area. For those areas marked “novice,” the professional can begin a search to find the appropriate development opportunities to move from “novice” to “proficient.”

Whose responsibility is it to make sure professionals have current training in specific areas of need?

ASSISTIVE TECHNOLOGY FOR STUDENT LEARNING

Accessing the General Education Curriculum

With few exceptions, students with disabilities are expected to meet the same high academic standards as their peers without disabilities. The Individuals with Disabilities Education Improvement Act (IDEIA) of 2004 and the No Child Left Behind (NCLB) Act of 2002 support the philosophy that all children, regardless of disability, should have access to the general education curriculum. Understanding the meaning of AT, the terminology associated with AT, and the laws and ethical standards that mandate AT are essential for learning how AT allows students with disabilities to access the general education curriculum and be successful learners.

ACCOMMODATIONS AND MODIFICATIONS For the purposes of this text, the terms *accommodations* and *modifications* are used to describe how students with disabilities can access the general education curriculum and be successful learners. **Accommodations** allow students access to the general education curriculum. They may include changes in teaching strategies, adaptations to the physical environment for physical access and to facilitate learning, and assessment of needs such as how a student responds in learning situations to demonstrate acquired knowledge or skills. A student's IEP team should address major decisions about accommodations and curriculum modifications for students with disabilities.

Modifications relate more to curriculum issues. Modifications provide changes in content or level by altering standards or expectations. Any decision to change curriculum content or the level of expectation from the required standard should be made by the student's IEP team. When modifications are made to a student's curriculum, the IEP team should also address assessment and grading issues.

The IEP team has the responsibility to identify first how the student will access the general education curriculum, and second, what accommodations and modifications the student will need to do so. In making these decisions, the IEP team must first determine the learning goals for the student. Then the team must decide what related services and/or accommodations and/or modifications (such as AT) the student will need to reach such goals. Deliberations and considerations must include the delivery of instruction, the environment where the student will receive instruction, and assessment issues. AT devices can be considered for each of these components. For example, the student may need to use a closed circuit television (CCTV) to read print materials such as texts, handouts for learning, and assessment materials. Without AT, many students with disabilities have limited or no access to instruction and to assessment.

The IEP team also should take a very close look at materials that the student needs to access and then determine how AT devices and services may support and allow for successful student learning. For example, a student with a visual impairment may benefit from better illumination of print materials. A light box that provides the appropriate lighting for a handout such as a map may accomplish this. As the IEP team and the teacher address those issues related to

instructional materials, the team might ask the question “How might we select and use materials that reach many students with diverse needs?”

COMMON CORE STATE STANDARDS The Individuals with Disabilities Education Improvement Act of 2004 mandated that all students with disabilities have access to the general education curriculum. Thus, educators should set goals for ensuring that students have that access (McGrath, Johns, & Mathur, 2004). To perform well on mandated high-stakes assessments, students must have appropriate access to the content of the curriculum. AT services and devices provide access. The IEP team may consider AT services and devices a related service. They may also consider AT services or devices for accommodations and/or modifications.

At the time of writing this book, 45 states and the District of Columbia have adopted the Common Core State Standards (CCSS). A **standard** is the grade-level expectation students must meet at the end of each academic year. According to the National Governors Association (2013), CCSS clearly communicate to administrators, teachers, and families the expectations for each grade level. More about CCSS and AT may be found in Chapter 2.

Curriculum is based on standards. Teachers must teach the curriculum that each state has determined all students will meet. When teachers know and understand the curriculum and the standards from which the curriculum is derived, they can arrive at more informed decisions that will enhance the student’s performance toward meeting expectations, as well as how AT might be used in this endeavor.

Students can access the general education curriculum in an inclusive setting. While teachers must determine how they will teach toward the standards and make the curriculum meaningful for each student, it is the IEP team that will ultimately decide how the student will meet the expectations.

Students can participate in meaningful ways in the general education curriculum and meet grade level expectations in ways that are appropriate for them. Professionals must consider the needs of students with disabilities in the areas of instruction and assessment. As IEP teams consider how students with disabilities will meet the demands of the curriculum, AT should be a critical consideration.

Ranging from light tech to high tech, AT has been very useful in accomplishing educational goals. IEP teams must ask themselves if students can perform the skills without any modifications or accommodations. If they can, specially designed instruction is not necessary. When designing an IEP, the team can use Figure 1-3 for guidance in determining the appropriateness of the performance outcomes for each student and how AT might affect student achievement. Utilizing the AT Continuum, Figure 1-4 illustrates how a goal is related to a CCSS in the eighth grade math curriculum.

Confidentiality and Privacy Issues

As required by law and supported by CEC, professionals working with students with disabilities must adhere to strict policy regarding privacy issues. CEC standards remind professionals that they must maintain confidentiality of information about students with disabilities and their families. In addition, professionals should respect confidentiality when communicating with parents. This includes any issues related to the AT and the student with a disability.

FIGURE 1-3 Determining Appropriate Assistive Technology for Meeting Curriculum Expectations

1. What grade-level standard(s) are appropriate for the student?
2. What does student data suggest regarding performance within the grade level?
3. If the student is not meeting grade-level expectations, would appropriate light-tech AT enhance the performance? If so, what type of light-tech AT would be appropriate?
4. If light tech is not appropriate, would high-tech AT enhance the performance? If so, what type of high-tech AT should be considered?
5. How will the AT be assessed to determine if it enhanced the student's performance toward meeting grade-level expectations?

Under federal law, students with disabilities and their parents are entitled to certain rights. Those include the right to procedural safeguards and the right to due process. The IDEIA of 2004 incorporates and expands on the tenets found in the Family Educational Rights and Privacy Act (FERPA). In general, FERPA gives parents certain rights with respect to their children's educational records maintained by the local education agency (FERPA, 2005). Schools must also have written permission from the parent or eligible student to release information from a student's record. It is good practice to remind the members of the IEP team about FERPA and other procedural safeguards for students with disabilities.

FIGURE 1-4 Common Core State Standards (CCSS) and the Assistive Technology Continuum

CCSS: Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. CCSS. ELA-Literacy.RL.8.1 (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010)

IEP Goal: Sarah will demonstrate expressive language by responding to questions.

No-Tech AT

The teacher will read the questions to Sarah, and Sarah will respond orally to each question with the correct answer.

Light-Tech AT

When working in small groups in science class, Sarah will respond to "yes" and "no" questions about the planets by pointing to "yes" and "no" picture symbols affixed to her desktop.

High-Tech AT

When given an essay to analyze, Sarah will use the screen reader and alternate keyboard on her computer to respond.

ASSISTIVE TECHNOLOGY SPOTLIGHT 1-1

The AT Continuum

Self-Assessment for Professional Development: Where Are My Areas of Need?

1. After taking the self-assessment, make a list of any areas that you marked "novice."
2. Begin a search for sources that provide professional development in these areas so that you can move from "novice" to "proficient." For example, you can search for workshops, professional literature, online courses, college courses, and so on.

ASSISTIVE TECHNOLOGY SPOTLIGHT 1-2

Self-Assessment for Professional Development:
How Do I Rate on the Top 10?

Skills	Novice	Proficient
1. Educational implications of characteristics of various disabilities	_____	_____
2. Definitions and terminology related to students with disabilities and assistive technology	_____	_____
3. Rights and responsibilities of students, families, teachers, and other professionals related to assistive technology	_____	_____
4. Laws, policies, and ethical principles regarding assistive technology	_____	_____
5. Role of the teacher in planning and implementing an individualized program for students with disabilities who use assistive technology	_____	_____
6. Strategies of consultation and collaboration regarding students who use assistive technology	_____	_____
7. Principles of universal design for learning	_____	_____
8. Implementation of assistive technology in planning daily instruction	_____	_____
9. Maintenance of assistive technologies	_____	_____
10. Incorporation of the use of assistive technology to conduct assessments	_____	_____

Chapter Review

- An assistive technology device is any piece of equipment or product system that can be acquired commercially or off the shelf, modified, or customized that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. An assistive technology service is any service that directly assists an individual with a diagnosed disability in the selection, acquisition, or use of an AT device (U.S. Congress, 1988).
- The Telecommunications Act of 1996 provided benefits to citizens as it related to the information superhighway into the twenty-first century. The Carl D. Perkins Vocational and Technical Act provided individuals with disabilities both academic and technical skills to gain success in a knowledge and skills economy. The Assistive Technology Act of 1998 supported programs and grants that helped states address technology needs of individuals with disabilities. Another act that provided the reauthorization of the Assistive Technology Act was the Assistive Technology Act of 2004. This act redirected funding to individuals by providing direct aid to individuals with disabilities. Other acts between 1975 and 2004 provided free appropriate public education (FAPE), revised transition services as part of the IEP, stressed positive behavioral intervention supports, and clarified that AT does not include surgically implanted medical devices. Other legislation, such as Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act, and the Elementary and Secondary Education Act, provided equal access and protected the rights of individuals with disabilities.
- The AT Continuum ranges from no-tech to light-tech to high-tech depending on the needs of the child.
- Funding sources for AT can include local education agencies; Medicare; Medicaid; private insurance; lending libraries; civic, church, and service clubs; and families and friends.
- Ethical standards of practice are often found within professional organizations that define and expand on a code of ethics and professional standards of practice.
- Professionals must take advantage of professional development opportunities by professional organizations and within their own professional practice. Engaging in and being part of purposeful professional development allows a person to continually update and keep abreast of a high level of competency.
- AT is useful to students with a diagnosed disability to assist in accessing the general education curriculum. This can be accomplished through accommodations and modifications. IEP teams must look at the general education curriculum as a whole and determine what modifications and accommodations would best meet the needs of the student in accessing the general education curriculum.

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2 | Assistive Technology, Universal Design for Learning, Response to Intervention, and Common Core for State Standards

LEARNING OUTCOMES

- Explain how assistive technology allows students with disabilities and other special needs access to the Common Core State Standards.
- Outline the ways that Universal Design for Learning allows educators to design appropriate learning environments for all students.
- List devices and services appropriate for students who are English language learners.
- Describe ways assistive technology can be a powerful tool for accessing and successfully mastering the CCSS.
- Analyze the impact of AT, UDL, and RTI on student learning.

Assistive Technology Snapshot

MEET MRS. JUANITA MARTINEZ

Mrs. Martinez is the school administrator for Freedom Elementary School. Freedom Elementary School is a small elementary school (pre-K–5th grade) in a rural setting. The school has a diverse student body, including English language learners (ELL), students from families with low resources, and students from families with high resources. The school is well known for its caring and effective teachers and for consistently meeting adequate yearly progress. The state has implemented the Common Core State Standards (CCSS) and all teachers have received training on the math and English language arts CCSS. All students with disabilities are thoughtfully and meaningfully included in the general education curriculum program and receive the same instruction, with adaptations, to meet the CCSS. The school was the first in the district to use the response to intervention (RTI) process for reviewing interventions for students who were struggling. To maintain the high standards of the school and to assure that all students have the opportunity to meet the CCSS, each teacher is encouraged to attend meaningful professional development events.

Each teacher has been trained in identifying students who need interventions to be successful learners.

Mrs. Martinez is also a successful grant writer. Therefore, the school is the frequent recipient of funds from a variety of grant sources. Recently, Mrs. Martinez received an application for a grant that provides funding for educational technology for use in the implementation of CCSS through the use of Universal Design for Learning (UDL). She understands that she must write a proposal that shows not only a need for such technology but also how the technology will impact student learning as it relates to CCSS. As an instructional leader, Mrs. Martinez appreciates the value of creating classrooms that provide access for all students. The funding from this source would significantly boost the already existing technology. Mrs. McDougal's plan is to begin with the upper grades and create classrooms that are flexible in using a variety of strategies, resources, and assessments to assist students in meeting the CCSS. She wants effective classrooms that provide all students equal access to mastering the CCSS.

PROVIDING ACCESS FOR ALL STUDENTS: AN INTRODUCTION

In the Assistive Technology Snapshot, you learned that Mrs. Martinez wants to structure the classrooms in her school to meet the diverse needs of the students. She understands that the students in her school are typical only because they represent a wide range of learning styles, abilities, and backgrounds. In planning for this diversity, she knows, as do other instructional school leaders, that in order to positively impact student learning, her teachers must have flexible teaching styles and incorporate teaching strategies to meet the needs of all students. With careful planning and intentional design of instruction, all learners can be successful. Universal Design for Learning (UDL) is one concept or philosophy that emphasizes instruction and services that can be used by students with the widest range of abilities (Taylor, Smiley, & Richards, 2009). UDL is included in

the CCSS in the section “Application to Students with Disabilities” (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2013).

COMMON CORE STATE STANDARDS

Common Core State Standards (CCSS) provide the foundation of educational expectations for all students, including those with disabilities. The National Governor’s Association and the Council of Chief State School Officers led the initiative of the CCSS (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2013). At the present time, 45 of 50 states as well as the District of Columbia have adopted the CCSS. The goal of the CCSS is to provide K–12 students with the opportunity to enter college and/or the workforce on equal ground. The CCSS provide equity for all students, regardless of background or schools they attend, to have access to an equitable curriculum from school to school (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2013). With this swift movement to adopt an all-inclusive set of standards, the CCSS movement provides students in America’s classrooms with a standard for learning and achievement across the board. The CCSS are designed to delineate a clear path for students to achieve the same curriculum standards across the board. The standards themselves will ensure that students receive a higher quality education among all states. This will affect every school in the country and provide teachers and parents the opportunity for a definitive understanding of the expectations for all students. Currently two subjects have been selected for the CCSS, math and English language arts. These were selected because both are foundational areas that build skill sets (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2013). Already, states are aligning and integrating all curricula with CCSS.

The CCSS outline for teachers clear expectations for all students. Clearly CCSS are designed to meet the needs of not only those students who function at grade level, but also those students who have a diagnosed disability or who are English language learners (ELL). The CCSS are designed to meet the needs of every student in American schools today. Teachers from all areas collaborate in grade-level meetings, content area meetings, IEP meetings, and parent conferences, with the same academic standards in mind. This streamlines the process for ensuring that all students are included in mastering CCSS. States have the option to determine how to best meet the needs of students with disabilities as well as those who are currently served as ELL. Each state has the flexibility to tailor the CCSS as needed for each student to achieve. This includes the utilization of evidence-based practices when decisions are made regarding accommodations and modifications.

CCSS and the Use of Assistive Technology

In order for all students to be included in the CCSS, AT is critical for students with disabilities to access the curriculum. Effective instructional leaders, teachers, and service providers understand that AT is an essential element in successful

What law (see Chapter 1) mandates that students with disabilities be included in the general education curriculum?

student outcomes. CCSS provide each state with the opportunity to share and embrace best practices as they relate to the services that will be provided for students with a diagnosed disability to be included. This must also be addressed as part of the students' IEP (see Chapter 3 for examples). With the adoption of CCSS in most states, it is now imperative that the IEP team take a closer look at AT as a means for ensuring that students with disabilities have the same access to master CCSS in an inclusive setting as their typically developing peers.

Technology has long been part of student learning and is now a common means of delivery of instruction (Cohen, 2012). Textbooks are readily available in electronic format, and many schools have adopted tablet computers for each student rather than textbooks for each content area. Students now make use of digitized learning. For students with a diagnosed disability, this is a good fit when it comes to accommodations and modifications. Many tablet computers have accessibility features built into their operating systems. All students will be able to use these features to access information in e-texts.

Universal Design for Learning and Common Core State Standards

The term *Universal Design for Learning (UDL)* comes from the field of architecture. The term was introduced in architectural design when federal mandates provided for universal access to buildings and structures for individuals with disabilities (Lieberman, Lytle, & Clarcq, 2008). The definition is derived from the meaning found in Section 3 of the Assistive Technology Act of 1998 (see Chapter 1 for more information on this act). It refers to UDL as a concept or philosophy for designing and delivering products and services that are usable by people with the widest range of functional capabilities and that include products and services that are directly usable (without requiring AT) and products and services that are made usable with AT (Sec. 602[35]). See Table 2-1 for more information about the Center for Universal Design and principles of design.

These guiding principles enabled educators to design a framework that enhances the ability of all students to access the general education curriculum and provides a framework for all learners to be successful. As UDL relates to education, it is a means to adapt—for all learners—all materials, methods, strategies, and delivery of instruction and evaluation instruments that are accessible and without barriers. In essence, educators can design appropriate educational programs, including learning environments, so that all students have the means to gain information as well as to express what they have learned.

One way to achieve this is to respond to individual differences by using the concept of UDL, which provides a map for creating flexible goals, strategies, resources, and assessments that accommodate the needs of a diverse group of learners. By identifying and removing barriers from pedagogy and resources, thus employing a philosophy of flexibility, teachers can ensure their students are successful learners. The framework for UDL, as it relates to education, can assist educators to know and understand that materials used within a curriculum are barrier free, and options to access and use them to engage learners will lead to a better learning environment for all students (Hitchcock, Meyer, Rose, & Jackson, 2002; Meyer & Rose, 2000). Within this framework, materials that are universally designed enhance the education of all students (Hitchcock, 2001).

Webquest 2.1

Why is UDL necessary? Go to <http://www.cast.org/udl/> for multiple examples of how UDL will provide access to the CCSS.

TABLE 2-1 UDL and CCSS Resources

National Center on Universal Design for Learning http://www.udlcenter.org/advocacy/faq_guides/common_core	Frequently asked questions about Common Core State Standards and the role of UDL.
Center for Universal Design http://www.ncsu.edu/ncsu/design/cud/	The Center for Universal Design is a national research, information, and technical assistance center that evaluates, develops, and promotes universal design in housing, public and commercial facilities, and related products.
Teaching Every Student http://www.cast.org/teachingeverystudent/	Teaching Every Student (TES) supports educators in learning about and practicing UDL.
Tool Kits for Teaching Every Student http://www.cast.org/learningtools/index.html	The CAST UDL Toolkits help educators to understand and apply UDL principles in classrooms and/or to train others in UDL. Using the UDL framework, the toolkits support varied learning styles, needs, and preferences for teachers and students. Interactive activities, tutorials, and tools are provided online; similar versions can be downloaded or printed.
UDL Planning for All Learners http://www.cast.org/teachingeverystudent/templates/UDLSolutionsTemplate.pdf	The Deriving UDL Solutions Template helps you select, assemble, or create flexible learning materials and methods, including tools, digital content, and Web-based materials, to minimize barriers for your students. You can download it in Microsoft Word or PDF format, to use on-screen or in print.
National Instructional Materials Accessibility Standard (NIMAS) http://nimas.cast.org/index.html	NIMAS guides the production and electronic distribution of digital versions of textbooks and other instructional materials so they can be more easily converted to accessible formats.
Common Core Standards http://www.corestandards.org/the-standards	Building on the excellent foundation of standards states have developed, the Common Core State Standards are an important step in providing our young people with a high-quality education. It should be clear to every student, parent, and teacher what the standards of success are in every school.
National Council for Teachers of Mathematics NCTM.org	The National Council of Teachers of Mathematics is the public voice of mathematics education, supporting teachers to ensure equitable mathematics learning of the highest quality for all students through vision, leadership, professional development, and research.
National Council for Teachers of English NCTE.org	The National Council of Teachers of English is devoted to improving the teaching and learning of English and the language arts at all levels of education.

Accommodations and Modifications are included in a student’s IEP. More information about IEPs may be found in Chapter 3.

Because it takes into consideration student learning styles, the learning environment, and the teaching style, UDL can offer a wide range of strategies that will benefit all students (Dukes & Lamar-Dukes, 2009). Students with disabilities who require accommodations and modifications to be successful learners benefit from what the UDL classroom provides to all students.

When determining the success of students with disabilities, teachers should consider how students will master the standard as well as how they will be assessed. UDL provides options that relate to both mastery and measurement. If teachers utilize the concept of UDL, this in itself is inclusive of all students. Tools could include computer-based programs such as tablet apps that provide a direct link to a specific source, e-books, visuals, and programs designed to highlight text and mathematics problems as students work through the specific standards. Light tech devices could include graphic organizers, cooperative learning arrangements, the use of highlighters, sticky notes for jotting down bulleted items, and leveled textbooks that include the same content but are written on a lower grade level. UDL provides a variety of methods of instruction, opportunities for learning, and assessment for all students.

As with any instruction, the classroom environment is an important element in the UDL/CCSS process. The design of the classroom should respond to the needs of the students, the curriculum, and delivery of instruction. Teachers should consider technology; learning stations; and seating arrangements for cooperative learning groups, independent learning activities, and whole group activities. They should also plan space for individualized activities that relate to the learning style of the student. With the adoption of CCSS, it is imperative that the learning environment consider UDL as a means to differentiate instruction

Many school districts are exchanging traditional textbooks for tablets with electronic texts. What features on a tablet may allow better access for students with disabilities and students who are ELL?

FIGURE 2-1 The Differences between AT and UDL

AT	UDL	Examples
Specially considered for an individual student with a disability	Used by a wide range of students	Laptop computers and screen readers are provided for all students who are reading below grade level in Mrs. Fuller’s biology course. John has an orthopedic impairment and needs a specially designed switch to access his computer.
Utilized by a student with a disability to meet the expectations for the curriculum determined by the IEP team	Make the curriculum accessible for students with diverse needs	All students in Mrs. Fuller’s biology class may choose to take examinations on the computer or with paper and pencil. Beth has a cognitive impairment and takes her modified biology test on the computer.
Decisions about AT are made by special educators and the student’s IEP team	Decisions are made and implemented by general educators	Mrs. Fuller utilized the state course of study, state adopted texts, and technology to design her UDL biology course. She provided multiple representations of course materials for students to be successful learners. Beth’s and John’s IEP teams determined the goals and AT they would each need to be successful learners in Mrs. Fuller’s biology class.

for all students. This provides a means for all students to have several different types of learning activities based on their learning style. If the classroom is set up with UDL practice in mind, it places all students on equal ground, thus providing more chances for mastery of CCSS. As students with disabilities are included in the accountability system, it is important that many paths of accessibility be made available for them to master the CCSS on an individual basis. Although UDL will eliminate many barriers for students with disabilities to access the CCSS, AT may still be required for many students with disabilities to access learning.

Assistive Technology and Common Core State Standards

The use of AT for students with disabilities to access the CCSS is something that has become commonplace in today's classrooms. AT devices and services are useful for all students if the concept of UDL is implemented along with AT. As decisions are being made regarding AT, the AT Continuum should be used to determine whether AT is needed and if it is, then whether light tech or high tech meets the needs of the student. (See Chapter 1 for more on the AT Continuum.)

CCSS provide a beginning and a basis for the groundwork when developing a student's IEP. The IEP is the critical plan that provides the vehicle for meeting the curriculum expectations of the CCSS. This plan includes supplementary aids and services, annual goals, instructional objectives, and specific accommodations and modifications for access to the curriculum standards. The role and responsibilities of the IEP team include the creation as well as the implementation of the plan. As much as possible, the student with a disability should participate in the rigorous demands of the curriculum. Accommodations and modifications only provide the opportunity for access.

AT is the tools and services by which students with disabilities can meet CCSS expectations while being included in the CCSS. Both light- and high-tech devices can be utilized based on the needs of the student. The IEP team should determine which devices and/or services students need to be successful. For example, high-tech devices could include text-to-speech, software programs with visuals, e-books, talking books, and tablet apps. Light-tech AT devices would be leveled textbooks, the use of social stories within a lesson, having other students or the teacher record the reading assignment, a note taker in the class, assistance from a peer, or cooperative learning groups in which the student can work with other students. Figure 2-2 shows examples of how AT provides access for a student to the CCSS.

AT is useful for many different types of students and varies according to the needs of the student. The IEP team has a plethora of light- and high-tech AT devices to consider when creating the IEP to address the student's progress in the CCSS.

CCSS: AT for Students Who Are ELL

Students who are ELL face different challenges within the education system. Many struggle with curriculum expectations taught in an emerging language (Coleman & Goldenberg, 2012). Teaching students who are ELL is complex.

FIGURE 2-2 AT and CCSS Examples**Example 1****CCSS.ELA-Literacy.RL.1.2:**

Retell stories, including key details, and demonstrate understanding of their central message or lesson. (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2013)

Possible AT:

Students can use text-to-speech software that allows them to highlight the beginning, middle, and end of the story on the computer. Visuals—either hand-drawn or icons downloaded from the computer—can be used to illustrate the beginning, middle, and ending portions of the story.

CCSS.ELA-Literacy.L.2.1e:

Use adjectives and adverbs, and choose between them depending on what is to be modified. (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2013)

Possible AT:

Light-tech devices might include flash cards with words written on them and visuals on the back representing each new word, or highlighter pens or paper to identify adjectives or adverbs in text. High-tech devices might include text to speech. Text to speech with visual icons over each adjective or adverb would also provide a visual for the student to see as the story is read. Any type of visual support would also help the student recall the word at a later date. Teachers can provide forms of media with audio identifying and explaining each word. Students can use digitized newspapers, e-books, and dictionaries.

Barriers of language and culture can prevent successful progress in the general education curriculum standards. Local education agencies must employ teachers who have the knowledge, skills, and cultural proficiency to be effective teachers for students who are ELL.

A teacher who excels in providing opportunities for all students to learn and who employs the UDL concept within the classroom will give students opportunities to obtain and comprehend information via many venues. Students who struggle in meeting the expectations of the CCSS because of lack of English proficiency may benefit from AT.

As AT is considered for students who struggle with English, instructional leaders and teachers must use the same approach for decision making that is used in determining the AT needs for students with disabilities. AT can be expensive, and the lack of a process for determining the best AT for a student may lead to costly mistakes and AT abandonment.

There are many light- and high-tech AT devices available for students who are ELL. Instructional leaders and teachers should use the assessment model in Chapter 3 to determine what AT will be the most effective for each student. Light-tech devices such as visual cards that represent vocabulary and content

may provide an AT solution for a student who is struggling with mastery of CCSS. Visuals can be downloaded from the computer or hand drawn by class peers and/or the teacher. As mentioned in the previous section, light-tech devices such as sticky notes, notes of various colors, highlighters, graphic organizers, and different colors of pens, pencils, and crayons are all means to help students comprehend the material being covered.

High-tech devices such as speech-to-text in both the student's native language and in English help with mastering not only the language but the content being presented. Speech-to-text software programs also can provide visuals above words that are in the text. Presenting materials through the use of AT enables the student who is struggling with English to work on grade-level standards. Finding the appropriate AT for students who are ELL provides effective means of access for these students.

RESPONSE TO INTERVENTION

Response to Intervention (RTI) first appeared as law in the IDEIA 2004. The process of RTI implements the practice of a comprehensive approach that emphasizes the use of scientifically based research interventions (Johnson & Smith, 2008). RTI is based on two key premises: (a) all students can learn when provided with appropriate, effective instruction and (b) early identification followed by immediate intervention may prevent most academic difficulties (Echevarria, Hasbrouck, & Hasbrouck, 2009). Designed as a multitiered system, RTI is used by school personnel to serve the needs of students who are struggling academically and/or who have behavioral concerns. Some school districts use a three-tier system and some use a four-tier system with multiple components and purposes.

The essential components of RTI include (a) the integration of student assessment, (b) instructional intervention, (c) identification of students who have specific learning disabilities, and (d) identification of students who are at risk for poor academic outcomes (National Center on Response to Intervention, 2010). As professionals identify and provide effective instruction as part of RTI, they must consider the critical value of UDL.

RTI AND UDL

RTI and UDL complement each other because they both relate to the education of all students. RTI is more process oriented and is used to make decisions in providing appropriate, effective instruction. The essential components of RTI enable school leaders and teachers to make decisions about what specific interventions best meet the needs of each child so that the child will be successful in accessing the CCSS. UDL sets the foundation and provides a framework in which to implement effective, research-based instruction and strategies. RTI and UDL are both aimed at improving student outcomes by providing educational supports (Strangeman, Hitchcock, Hall, & Meo, 2006). The RTI process, when implemented within the concepts of UDL, gives much to instructional leaders and teachers who are making critical decisions regarding specific interventions for each student. Implementing the process of RTI within the framework of UDL could result

in fewer referrals for special education services and provide a means to expand the interventions found to be useful to meet the diverse needs within each classroom (Strangeman, Hitchcock, Hall, & Meo). A small minority of students are identified in the RTI process who need additional support to access instruction and meet expectations of the CCSS. AT, light and high tech, may be appropriate for these students.

AT: UDL, RTI, AND CCSS

Technology is commonly utilized in the UDL classroom (Council for Exceptional Children, 2005). In the Assistive Technology Snapshot, Mrs. Martinez recognized the role that technology plays in providing and delivering effective instruction. Technology enables the UDL designer to meet the challenges of the UDL framework to enhance the opportunity for all students to master the CCSS. Using technology allows for faster creation and design of curricula. For students with diverse learning needs, technology enhances curriculum and instruction, provides access to curriculum and learning, and engages and motivates students in meaningful learning experiences (Council for Exceptional Children, 2005; Crowder, 1999). The utilization of technology, specifically AT, can be a very powerful tool for students to access and successfully master the CCSS.

RTI and UDL provide for the creation and design of instructional materials and activities that enable students with differing abilities to attain CCSS. These goals are achieved with flexible curricular materials and activities that provide alternative learning opportunities for the various ways students learn. These options are built into the design of the materials (Crowder, 1999). Thus, UDL products present multiple approaches to meet the needs of diverse learners and allow educators to customize teaching for individual differences (Hall, Meyer, & Rose, 2012). With this in mind, educators can use these approaches for designing specific interventions for each student in the RTI process and thus meet the specific needs of each student and make the classrooms and CCSS more universally accommodating for all students. For example, teachers may use software that accompanies a text and offers reading supports, such as a text-to-speech or visual highlights. Other computer programs that use technology to support each student's achievement would also be a consideration for all students in an effort to better incorporate the UDL concept within each classroom.

ASSISTIVE TECHNOLOGY FOR STUDENT LEARNING

UDL, RTI, and CCSS: An Impact on Learning for All Students

The UDL and RTI models have a critical implication for all students. Educators who embrace the UDL concept for classroom design and adaptations to the curriculum make the learning process optimal for all students. The RTI process is one that provides classroom teachers with input from other colleagues on the successful implementation of various interventions based on the individual needs of each student. As introduced in the Assistive Technology Snapshot at the beginning of the chapter, it is important that educators be open to redesigning their classrooms based on the UDL concept. The RTI process has been described

Webquest 2.2

Use the search feature of your internet browser to find apps for academic intervention. Select an app and evaluate it using the evaluation tool found in Chapter 3.

as a science because it is constantly evolving in the decision process that relates to practice (Jimerson, Burns, & VanDerHeyden, 2007). The practice of integrating UDL and RTI will improve the delivery of instruction and reduce the number of referrals for special education. Students receiving better interventions in the classroom to accommodate each learning style perform better academically. When UDL and RTI are combined, the use of AT can be a powerful and critical support in enabling all students to progress in the CCSS.

ASSISTIVE TECHNOLOGY SPOTLIGHT 2-1

UDL, RTI, and CCSS: Consideration for Thought

1. UDL provides an accessible classroom for all students to learn and master CCSS.
2. RTI provides a process for the consideration of interventions that can change the way instruction is delivered to better meet the needs of each student in achieving the CCSS.
3. UDL provides for adaptability within the classroom in meeting CCSS.
4. RTI provides for the use of scientifically based research strategies for students to master the CCSS within the intervention process.
5. UDL and RTI are constantly assessed to make sure each student receives optimal learning opportunities to access CCSS within each classroom.
6. Within the UDL concept, the materials, the strategies, and the means of assessment are designed to be flexible enough to meet the needs of all students (Hall, Meyer, & Rose, 2012; Hitchcock, Meyer, Rose, & Jackson, 2002).

Chapter Review

- Students with a diagnosed disability can use AT to access CCSS. Instruction can be delivered through tablet computers, AT software, and accessible features built into the operating system.
- UDL provides a map for creating flexible goals, strategies, resources, and assessments that will enable a student to access and be successful in CCSS. UDL provides options that relate to both mastery and measurement. UDL provides a means whereby teachers can design the classroom environment that will respond to the needs of all students.
- Some devices and services for ELL students include visual cards that represent vocabulary and content, the use of sticky notes of various colors, highlighters, and different colored pens, pencils, and crayons. Students can gain an understanding and comprehend materials through using each of these items.
- RTI, UDL, and AT all have a positive impact on student learning. RTI is useful as a tiered system to serve the needs of academically struggling students. UDL provides the educational support a student needs in order to access the CCSS. Technology is a component that can be part of UDL. Technology enables the UDL designer to meet the needs of students in order to master CCSS.

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