



American Academy of Special Education Professionals

AASEP

STAFF DEVELOPMENT in SPECIAL EDUCATION

The Special Educator's Role with Assistive Technology

Overview of Assistive Technology

As special educators, you will need to be responsible for understanding and being aware of the numerous assistive technology (AT) options offered to children with special needs. With the increase of technology in today's society, nowhere is the use more evident than in the classroom situation. As a special educator working with children with disabilities, you will be required to assess, use, purchase and monitor progress of a variety of assistive technology devices and software. Knowing what is available for children with different disabilities can enhance their performance in the classroom, and in many cases, even the playing field so that they can function in an inclusion classroom. Further, all IEPs contain a section on assistive technology and will often be an integral part of the child's individualized education plan, along with modifications and accommodations. Since you may be actively involved in writing IEPs, you may be called upon for recommendations pertaining to assistive technology devices for your students.

Definition of Assistive Technology

AccessIT (2006) defines assistive technology as "...technology used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible. Assistive technology can include mobility devices such as walkers and wheelchairs, as well as hardware, software, and peripherals that assist people with disabilities in accessing computers or other information technologies."

Under the Individuals with Disabilities Education Act of 2004 (IDEA), the federal special education law, assistive technology is: "any item, piece of equipment, or product system... that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." Assistive technology devices can be used in the educational setting to provide a variety of accommodations or adaptations for people with disabilities.

IDEA also lists the services a school district may need to provide in order to ensure that assistive technology is useful to a student in the school setting. This service includes all of the following possibilities:

- evaluation of the technology needs of the individual, including a functional evaluation in the individual's customary environment;
- purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices for individuals with disabilities;
- selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing of assistive technology devices;
- coordinating and using other therapies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs;
- assistive technology training or technical assistance with assistive technology for an individual with a disability, or, where appropriate, the family of an individual with disabilities;
- training or technical assistance for professionals, employers, or other individuals who provide services to, employ, or otherwise are substantially involved in the major life functions of individuals with disabilities.

The intention of the special education law is that, if a student with disabilities needs technology in order to be able to learn, the school district will (a) evaluate the student's technology needs, (b) acquire the necessary technology, (c) coordinate technology use with other therapies and interventions, and (d) provide training for the individual, the individual's family, and the school staff in the effective use of the technology.

Areas of Instruction in which AT can Assist Students

Lahm and Morissette (2002) identified areas of instruction in which AT can assist students. Six of these are described here: (1) organization, (2) note taking, (3) writing, (4) academic productivity, (5) access to reference and general educational materials, and (6) cognitive assistance.

Organization

Low-tech solutions include teaching students to organize their thoughts or work using flow-charting, task analysis, webbing, and outlining. These strategies can also be accomplished using high-tech, graphic, software-based organizers to assist students in developing and structuring ideas. Such graphic organizers allow students to manipulate and reconfigure brainstormed ideas and color code and group those ideas in ways that visually represent their thoughts. Another high-tech solution might be the outline function of word processing software, which lets students set out major ideas or topics and then add subcategories of information. Using the Internet, local area networks, or LCD projection systems enables students and their teachers to collaborate, give feedback, and modify these applications either as a group or individually at different times.

Note Taking

A simple, no-tech approach to note taking is for the teacher to provide copies of structured outlines in which students fill in information. Low- and high-tech methods include

- Videotaping class sessions for visual learners or those who are unable to attend class for extended periods of time.
- Sending web-cam photography across the Internet to allow students to see and hear what is happening in class (for students who are unable to attend class).
- Sending class notes or presentations to students via e-mail.
- Translating print-based notes to voice by using optical character recognition (OCR) software with a voice synthesizer.
- Using notebook computers, personal digital assistants (PDAs), or portable word processing keyboards to help students with the mechanics of note taking.

Writing

Word processing may be the most important application of assistive technology for students with mild disabilities. Writing barriers for students with mild disabilities include

- Mechanics: spelling, grammar, and punctuation errors.
- Process: generating ideas, organizing, drafting, editing, revising, and producing a neat, clear final copy.
- Motivation: interest in writing.

Grammar and spell-checkers, dictionaries, and thesaurus programs assist in the mechanics of writing. Macros are available that will insert an entire phrase with the touch of a single key. Word prediction software helps students recall or spell words.

During the writing process, word processors allow teachers to make suggestions on the student's disk. If computers are networked, students can read each other's work and make recommendations for revision. Computer editing also reduces or eliminates problems such as multiple erasures, torn papers, and poor handwriting. The final copy is neat and legible.

Motivation is often increased through the desktop publishing and multimedia capabilities of computers. A variety of fonts and styles allow students to customize their writing and highlight important features. Graphic images, drawings, video, and audio can provide interest or highlight

ideas. Multimedia gives the student the means and the motivation to generate new and more complex ideas. For early writers, there are programs that allow students to write with pictures or symbols as well as text. In some of these programs, the student selects a series of pictures to represent an idea, then the pictures are transformed to words that can be read by a synthesizer and then edited.

Academic Productivity

Tools that assist productivity can be hardware-based, software-based, or both. Calculators, for example, can be separate, multifunction devices or part of a computer's software. Spreadsheets, databases, and graphics software enhance productivity in calculating, categorizing, grouping, and predicting events. The Internet, computers, and PDAs can also aid productivity in note taking, obtaining assignments, accessing reference material and help from experts, and communicating with peers. Instead of relying on the telephone, students are increasingly sharing documents, using instant messaging, and transferring documents to each other as e-mail attachments.

Access to Reference and General Educational Materials

Access to the general education curriculum is emphasized by IDEA and includes the ability to obtain materials as well as the ability to understand and use them. Many students with mild disabilities have difficulty gathering and synthesizing information for their academic work. In this arena, Internet communications, multimedia, and universal design are providing new learning tools.

Internet communications can transport students beyond their physical environments, allowing them to interact with people far away and engage in interactive learning experiences. This is particularly appropriate for individuals who are easily distracted when going to new and busy environments such as the library, who are poorly motivated, or who have difficulty with reading or writing. Students can establish "CompuPals" via e-mail or instant messaging with other students, which often motivates them to generate more text and thus gain more experience in writing. Students can also access electronic multimedia encyclopedias, library references, and online publications. However, these experiences should be structured, because it is easy to get distracted or lost as opportunities are explored.

Multimedia tools are another way in which information can be made accessible to students. Multimedia use of text, speech, graphics, pictures, audio, and video in reference-based software is especially effective in meeting the heterogeneous learning needs of students with mild disabilities. While a picture can be worth a thousand words to one student, audio or text-based descriptive video or graphic supports may help another student focus on the most important features of the materials.

Used in conjunction with assistive technology, e-books can use the power of multimedia to motivate students to read. They include high-interest stories: the computer reads each page of the story aloud, highlighting the words as they are read. Fonts and colors can be changed to reduce distraction. Additional clicks of the mouse result in pronunciation of syllables and a definition of the word. When the student clicks on a picture, a label appears. A verbal pronunciation of the label is offered when the student clicks the mouse again. Word definitions can be added by electronic dictionaries and thesaurus. These books are available in multiple languages, including English and Spanish, so students can read in their native language while being exposed to a second language.

The Center for Applied Special Technology (CAST) promotes the concept of universal design (Rose & Meyer, 2000), which asserts that alternatives integrated in the general curriculum can provide access to all students, including a range of backgrounds, learning styles, or abilities. Providing material in digital form, which can easily be translated, modified, or presented in different ways, can often attain the goal of universal design.

Cognitive Assistance

A vast array of application program software is available for instructing students through tutorials, drill and practice, problem solving, and simulations. Many of the assistive technologies described previously can be combined with instructional programs to develop and improve cognitive, reading, and problem-solving skills. Prompting and scheduling through PDAs, pagers, and Internet software also can assist students in remembering assignments or important tasks. They can help students to follow directions or a sequence of events, establish to-do lists, take and retrieve notes, check spelling or look up words in a dictionary.

Today, a nonverbal child speaks with the help of an electronic communication aid. A student with learning disabilities masters math facts using a computer game. A child with vision problems can benefit from an inexpensive device that enlarges printed words on the computer screen. And for more severe vision problems, there are speech synthesizers that can be used with computers to convert typewritten words or text into an electronic voice.

For the child who has a physical disability, there are special devices that will allow him or her to input information into the computer without using the conventional keyboard. This can be done through the use of a single switch or some type of voice recognition system. There are other alternative input devices that can be used simply by touching the computer screen or touching points on a touch-sensitive tablet that correspond to the points on the computer screen.

Computer and other technologies have expanded and enriched lives and given many children with disabilities options not imagined a decade ago. As there is a wide array of assistive technology, so too are there many decisions, choices and options for families and professionals. Making informed decisions about technology is a challenge that many consumers will encounter in coming years. Resources are available to assist consumers such as: current periodicals; disability, parent, and professional organizations; national technology centers; and private companies. Walking the assistive technology maze can be made less complex and confusing by understanding the implications of technology in the lives of children and youth with disabilities, and by knowing where to go for help.

Computers were designed to perform at maximum efficiency when used by the non-disabled. But almost all of us employ some type of adaptive technology when using the computer. Adaptive technology ranges from wearing eyeglasses or wrist supports, to simply adjusting the brightness of the screen display or the height and angle of the monitor. Broadly defined, assistive technology includes any device or piece of equipment that increases the independence of a person with disabilities. Assistive technology for the disabled, of course, is not new. For instance, the wheelchair has long been an indispensable assistive device for those with impaired mobility.

The distinction between adaptive technologies employed by the non-disabled and assistive technologies for the disabled blurs at times. Some of the assistive technologies designed for the disabled have proven so ergonomically sound that they have been incorporated as standard features.

One such example is the placement of the keyboard on/off switch, which was designed so that people with motor impairments would not have to reach to the back of the machine to turn the power on and off.

Assistive technology has increased enormously the ability of those with disabilities to lead independent lives. Computer-based environmental control units allow users to turn on lights and appliances and open doors from a wheelchair. Augmentative communication devices enable those who cannot speak to voice thoughts and needs using touch- or light-activated keyboards coupled to synthetic speech systems. Screen reading programs for the blind, screen magnification systems for those with low vision, and special ability switches that permit the mobility-impaired to use a computer are only a few examples of the technology by which the individuals gain access to the computer screen and keyboard.

Assistive Technology for the Visually Impaired

If you are involved with a student with a visual impairment in your classroom you will need to be aware of the types of assistive technology devices available. This type of technology assistance is crucial for a child with this type of disability in order to allow for a greater chance of succeeding with the demands of the curriculum. The technology available to computer users who are blind or have low vision is extensive. The choice of the appropriate technology depends on a number of factors. Among them are:

- the cause of the visual loss,
- the extent of loss of visual acuity,
- the quality of peripheral vision, and
- any other physical or mental limitations that might affect use of a computer.

Following are examples of assistive devices designed to help those with disabilities:

Speech and Braille

Software is available that gives audio cues to on-screen visual images such as icons, windows, menus, and cursor location (the numeric keypad replaces the need for a mouse). Other programs convert text to Braille and formats printing on a Braille embosser.

Another item that may assist your students is a synthetic speech system. This is composed of two parts; the synthesizer that does the speaking, and the screen access program that tells the synthesizer what to say.

Magnification Devices

Many times your students can be assisted in school by magnifying the presentation of the material. There are several things that can be done to enlarge the images on the screen. One solution is software that magnifies the screen image up to 16 times its regular size.

Other magnification solutions range from monitors that display images in multiple resolutions to magnification lenses that attach to the outside frame of the monitor. You may also want to consider using software that reads text aloud, so that instead of looking at the words on your computer, you

can listen to them. Many companies that provide assistive technology software and devices can be found on sites like <http://www.Atto.buffalo.edu>.

Systems also exist that offer the ability to scan hard-copy text into a PC that then magnifies it on the computer screen.

Optical Character Recognition Systems

Optical character recognition (OCR) technology offers blind and visually impaired persons the capacity to scan printed text and then speak it back in synthetic speech or save it to a computer. There are usually three essential elements to OCR technology--scanning, recognition, and reading text. Current generation of OCR systems provide very good accuracy and formatting capabilities at prices that are up to ten times lower than a few years ago.

Computer Assistive Technology for the Hearing Impaired

FM Trainers

Many deaf and hard of hearing children are able to participate fully in regular classroom education with the aid of FM [listening] systems. These devices allow the teacher, or other speaker to talk into a small microphone, which transmits their voice directly to the child's hearing aid. This reduces the impact of poor acoustics and classroom noise and allows the child to hear what she needs. The Federal government understood the value of this service and had set aside a part of the radio spectrum 216-217 MHz for use by these devices.

Many other devices are available for students with hearing impairments that can assist them in their daily lives. As a special education teacher of a child with a hearing impairment many of these devices should be shared with parents of these children.

Alerting Devices/Systems

If you have a child with a hearing impairment in your classroom you will need to be familiar with the devices specifically designed for this population. The various alerting and alarm systems that signal deaf and hard of hearing people include:

- security systems
- baby cry alarms
- smoke alarm systems
- doorbell alerting systems
- paging devices
- telephone signaling systems
- wake-up alarms

The signal may be visual (a flashing light): auditory (an increase in amplification: or vibrotactile (a vibrator). For instance, if an alarm clock is wired to a vibrotactile device under the bed pillow, the user is literally shaken awake. Auditory signals are sometimes used in conjunction with either visual or vibratory signals.

Telephone Aids

Amplification Devices may include a specially wired telephone handset, with an amplification device, portable amplifiers that attach to a phone. Such volume control handsets may provide up to 30 percent additional power for the listener who has a hearing loss. These devices may be used with or without an individual's hearing aid.

TTY's and TDD's

Text telephones (TTY) and telecommunication devices (TDD) enable deaf and hard of hearing people to have conversations by typing messages that are sent through the telephone network. While these devices offer deaf and hard of hearing people a major form of communication, they are rather slow devices, especially when compared to computers.

Telecaption Adapters

These devices sometimes referred to as television decoders attach to the television and enable deaf and hard of hearing people to read captions on their television screens.

Computer Assistive Technology for Individuals with Mobility Impairments

Being a special education teacher of children with mobility disabilities requires a thorough knowledge of assistive technology devices. Most of these students will have assistive devices or will be in need of them sometime in their educational career. Being aware of what is available will allow you to provide your students with more assistance and a better chance of succeeding in the classroom.

Many adaptations are available to assist those with impaired mobility to use the computer. Although a standard keyboard and mouse are the input devices of choice for most people, other devices have been developed. Among the most frequently used are modified and alternate keyboards, ability switches, and headpointers and joysticks. Whatever the method, the computer treats the input from these methods as if it had been received through the standard keyboard. Descriptions of three of these follow.

Keyboards

There are dozens of different kinds of keyboards for your students depending on personal abilities and preferences, any of a number of them may be appropriate. The right keyboard may be the kind that looks like a traditional keyboard, but has large, touch-sensitive keys to help make typing easier. Another has only seven keys and uses a typing technique called "chording," originally designed for one-handed typists.

Some adjustable keyboards split into two sections and conform to the natural position of the child's arms to make typing comfortable. Other products include switch-operated, on-screen keyboards that let the student type with almost any part of his/her body, and "smart" keyboards that allow the student to customize each key's position, size, and function.

Mouse Alternatives

Your students may need an altogether different kind of pointing device than a mouse. If so, there are many from which to choose: head-controlled mice, trackballs (in effect a mouse turned upside down), joysticks, mice of different sizes and speeds, writing pads that function as mice, touch-sensitive screens that act as mice, and even remote-controlled mice.

Input Systems

Keyboards and mice are traditionally used to control personal computers. Although your student may not be able to use these devices, you can choose between a number of alternatives, including: a voice recognition system that allows a person to control the computer by talking to it; an on-screen keyboard that facilitates typing without physically touching the keys; and a head-controlled keyboard/mouse that lets a person type using head movements.

Assistive Technology Screening Evaluations

There may be times when you may be asked to determine a child with a disabilities' need for an assistive technology device. While many school districts may utilize outside agencies to determine the appropriate device through an assistive technology evaluation, some districts may use the special education staff for this evaluation. If that should occur, you should be aware of what you will need to do if asked to perform this role.

The following assistive technology report outlines the areas that need to be covered. If you are asked to do this evaluation and you know the type of assistive technology device necessary i.e. word processor, then secure 3-4 different types and evaluated the child on each device to see on which one he/she performs best. You may want to consider the following factors in making the decision:

- the abilities of a child; his/her interests and preferences
- the family's culture and value system
- the environment in which it will be used in
- the functional tasks for participating in daily routines
- available materials and technologies
- the barriers to his/her participation
- ongoing intervention and evaluation

Conclusion

This course has provided an overview of the different areas of assistive technology that you will need to explore so that the children you serve will have the best opportunity to have the appropriate assistive technology if the need is present. It is therefore essential to investigate every student's needs for possible assistive technology and make that recommendation so that it can be included on his/her IEP.