Assistive Technology in the Classroom

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There is a continued need to provide information about the availability of assistive technology, advances in improving accessibility and functionality of assistive technology, and appropriate methods to secure and utilize assistive technology in order to maximize the independence and participation of individuals with disabilities in society.

Perspective

A new teacher or one who has been on the front lines for a number of years soon recognizes that not all children learn the same way or have the same needs for successful learning experiences. Through undergraduate teacher training or in-service workshops, teachers gain useful skills in using technology to plan, prepare, and provide instruction. Technology and career and technical education teachers frequently have the skills, knowledge, and tools to provide successful learning experiences for children with wide ranges of abilities beyond what may be expected of traditional teachers. However, as we look at federal and state laws and regulations regarding children identified with special needs, we will find that there are a number of resources that are available to assist in acquiring or purchasing special technology for class members who have unique needs.

Figure 1. Most all computers require the use of a pointing device such as a mouse to interact with screen prompts, select and enter data, or execute software processes and operations. The hat shown in the photograph actually has a special Infrared reflective material on the brim that works in conjunction with a small transmitting device and software that provides very accurate screen pointer control. The user just moves his or her head to control the pointer on the computer screen. This enables a person with poor or no motor control of their hands to interact with a computer.
It is easy to recognize that computer and information technologies play a major role in business, industry, and education. Additionally, communication and information technology has become a required tool for academic achievements and participation in activities. All students, including students with disabilities, need to be able to access this technology. As career and technical education teachers, we can use information technologies to create and enhance the learning experiences.

**What is Assistive Technology?**

Assistive technology is any piece of equipment or device that may be used by a person with a disability to perform specific tasks, improve functional capabilities, and become more independent. It can help redefine what is possible for people with a wide range of cognitive, physical, or sensory disabilities. (RESNA)

Very simply, assistive technology may enable a person with a disability to do something they normally would not be able to do on their own, such as fishing or boating, talking on the phone, opening a drawer, cooking dinner, buttoning a shirt, or reading his or her bank statement. Assistive technology may include cognitive aids, adaptive toys, communication aids, alternative computer access, aids to assist with walking, dressing, and other activities, visual aids, or aids to augment hearing that facilitate activities typically done as part of daily living.

This technology may range from very low-cost, low-tech adaptations (such as a "battery interrupter" to make a toy switch accessible) to high-tech, very expensive devices (such as a powered wheelchair and environmental controller operated by tongue-touch). An example alternative means of operating a personal computer and interacting with software is the "Natural Point" hands-free alternative mouse-pointing system.

People with disabilities may use assistive technology to participate in everyday activities encountered in learning, recreation, and work. Assistive technology can help individuals become mobile, communicate more effectively by seeing and hearing better, and participate more fully in learning activities. Screen and reading magnifying technologies can be used to magnify computer applications and software as well as print physical objects such as shown in Figures 2 and 3. Computer-screen magnifiers allow the user to "split" a screen into two views—one normal view along with a magnified view. The degree of magnification can be controlled by the user to suit his or her needs. Further, screen magnifiers also may have a full-screen magnification.

Figure 2. A low-vision device such as this HumanWare's Smart View® shown in an assistive technology demonstration lab at Old Dominion University, is an example of a video magnifier and can be used to magnify static and moving objects. The video technology consists of a video camera and display device that can be used to provide magnified vision of printed materials and provide the capability to "work under the camera" to do manipulative activities such as writing or working with small parts and components.

Figure 3. Frequently, visually impaired individuals can benefit significantly with simple visual enhancement tools such as computer-screen magnifiers. Screen magnification can be controlled by the user and configured to magnify areas of a screen or the complete screen with magnifications to about 10X.
mode as opposed to a split screen. Low-vision devices such as HumanWare’s Smart View® is an example of a video magnifier and can be used to magnify static and moving objects, e.g., reading text material or writing assignments that may parallel learning activities.

As career and technical education teachers, we may employ examples of accessible electronic and information technology in education in the following ways:

- Accessible webpages allow students with disabilities to access information, share their work, communicate with peers, teachers, and mentors, and take advantage of online learning options.
- Accessible instructional software (on disks, CDs, or other media) and documentation allow students with disabilities to participate side by side with their peers in computer labs and classrooms; collaborate with each other; create and view presentations, documents, and spreadsheets; and actively participate in simulations and all other academic activities.
- Accessible telecommunications and office equipment make communication and educational administrative functions accessible to everyone, including people with mobility, visual, and hearing impairments. (VATS)

Case Studies Provide Insights
Perhaps one of the easiest ways to describe and illustrate how assistive technologies can be used is through the use of case studies. Betsy and Henry are two individuals who can benefit though the use of assistive technologies. While their stories are brief, they do provide insights as to how technology can expand their horizons and independence.

Betsy’s Story
Betsy, an eighteen-year-old with mild cognitive delays and CP, is in high school. She has been using a laptop computer and switch-access hardware and software in lieu of a pencil and paper to complete work in high school. The equipment and software were provided by the school district through the IEP process. Betsy’s current goal, articulated in her Individual Transition Plan (ITP) as mandated by IDEA, is to have a full-time job by the time she is 22. She wants to work in an office and would use a computer system similar to her current setup. As she moves into the transition period, these questions must be addressed:

- Will the laptop computer she has been using be functional for her in the workplace?
- Will she need to consider new equipment? What would influence a decision to purchase new equipment?
- What funding sources might help Betsy to purchase new equipment?
- What case should Betsy make for funding?

Betsy is fortunate to have learned computer and word-processing skills in her career and technical education classes. Now she must learn ways to transfer these skills into the work setting. Laptop computers are not typical in offices; instead what Betsy is more likely to encounter is a desktop workstation with computer and printer. In order to use a standard computer, Betsy will need a switch-access device and an onscreen keyboard to do word processing and data entry.

Since single switch access is necessary for Betsy to become employed in an office setting, Betsy’s vocational rehabilitation counselor was willing to make such a purchase for her. Betsy applied to be a data processor with a temporary employment firm and got the job. Betsy’s vocational rehabilitation counselor helped her to select switch-access hardware compatible with most Windows-compatible computers. In her new job, Betsy changes office settings frequently. Each time she moves, she takes her switch-access device and onscreen keyboard software with her. With these portable items, she is able to adapt each new office setting to meet her needs. Having the right technology has made Betsy an adaptable and successful temporary office employee.

Assistive Technology at School Age and Beyond
When students enter kindergarten and begin their regular public school years, assistive technology can be a part of their special education programs. For students who are eligible for special education, assistive technology must be provided when it is necessary to do one of the following:

- Support placement in the least restrictive environment.
- Ensure that a student benefits from his or her education.
- Implement the goals and objectives in the student’s IEP.

Assistive technology should be considered as an option for every IEP. Some students, of course, will not require technology, but many students will benefit from technology that helps them to compensate for their impairments. School districts are not required to provide all of the possible assistive devices that might be nice to have or might provide the best possible arrangements. Assistive technology is required, however, when its presence enables the student to make reasonable progress toward the goals the IEP Team identifies.

Assistive technology can be included in the IEP in a number
of ways. It may appear as part of the student's annual goals or short-term objectives. It may also appear in a list of specific accommodations that need to be made in order for the student to function in the least restrictive environment. For example, the IEP might include such accommodations as the use of word processing, use of a calculator, use of a hand-held spell checker, or text-to-speech technology as shown in Figure 4. In addition, the IEP may specify that, as a related service necessary for the student to benefit from his or her education, the student will receive training in the use of assistive equipment like an electronic communication device, a power wheelchair, or a personal computer.

**Henry's Story**

Henry is a seventh grader with a neuro-muscular disease that has caused him to lose physical function. He is a bright student with excellent academic skills. Henry uses a laptop computer with a trackball and an onscreen keyboard to do all his written work. He navigates skillfully around the school building using a power wheelchair. Technology has really helped Henry to fit in and do well at school. However, now as a young adolescent, Henry is beginning to feel left out socially. He requires so much help with his physical needs that he has to spend lots of time with adults. Henry wants to "hang out" like the other kids his age and escape adult scrutiny once in a while.

Henry is nonverbal. He uses a complex, sophisticated electronic communication device to participate in class. The device is programmed with phrases that Henry frequently uses, and he also can select icons to create sentences of his own. Henry's communication device works well for him in formal classroom settings, but it is bulky and cumbersome to use in casual conversation with friends. Henry has come to believe that his communication device is actually a barrier to the kinds of informal interactions he wants to have.

Henry knows that he has the best in technology and that the equipment he uses was very expensive. He doesn't want to appear "greedy" or demanding, so he has not told his parents about his dissatisfaction with his ability to communicate. One of Henry's friends, John, however, noticed that Henry was acting pensive and unusually quiet. John gently coaxed the truth out of Henry and offered to help his friend think of a new way to "talk" that would provide him with more flexibility and independence.

When Henry and John put their heads together, they came up with lots of ideas. The one they settled on as the most feasible involved using the laptop that Henry already had. The laptop had some advantages because it was small and portable and Henry already knew how to use it very well. In a catalog of special-needs software, the friends found communication software that operated on an icon system, and the price was right—around $100. With communication software installed on the laptop, Henry had a simpler, more portable device for talking in casual settings.

Next, John asked his technology education teacher to help them design a tray for Henry's wheelchair that would hold the laptop and fold down beside the chair out of the way when not in use. The technology teacher fielded the idea and design problem with his Design and Technology class for solutions. One design team came up with a clever tray on hinges that folded to the side. The laptop fastened to the tray with wide rubber bands. A handle on the tray allowed Henry to raise and lower the tray as needed.

In addition to his laptop, Henry also needed a device for quick greetings and spontaneous retorts. Henry and John chose a programmable switch with the capacity to record up to 12 messages. Henry could operate the switch quickly by hitting it with his elbow. He and John had a great time recording messages suitable for talking to their friends or to girls.
What Henry found out was that he needed multiple ways to communicate so that he could customize his electronic speech to fit the setting and the occasion. For a relatively small financial investment, Henry and John were able to expand communication possibilities for Henry and allow him greater control and personal choice about what he said, how he said it, and to whom.

**Summary**

Substantial progress has been made in the development of assistive technology devices, including adaptations to existing devices that facilitate activities of daily living that significantly benefit individuals with disabilities of all ages. These devices, including adaptations, increase involvement in, and reduce expenditures associated with, programs and activities that facilitate communication. Ensure independent functioning, enable early childhood development, support educational achievement, provide and enhance employment options, and enable full participation in community living for individuals with disabilities. Access to such devices can also reduce expenditures associated with early childhood intervention, education, rehabilitation and training, health care, employment, residential living, independent living, recreation opportunities, and other aspects of daily living.

Technology and career and technical education teachers frequently have the skills, knowledge, and tools to provide successful learning experiences for children with wide ranges of abilities beyond what may be expected of traditional teachers. Recognizing these needs and using assistive technologies can open up new horizons opportunities for students in career and technical education classes.

Over the last 15 years, the federal government has invested in the development of comprehensive statewide programs of technology-related assistance that have proven effective in assisting individuals with disabilities in accessing assistive technology devices and assistive technology services. This partnership between the federal government and states provided an important service to individuals with disabilities by strengthening the capacity of each state to assist individuals with disabilities of all ages meet their assistive technology needs.

Despite the success of the federal/state partnership in providing access to assistive technology devices and assistive technology services, there is a continued need to provide information about the availability of assistive technology, advances in improving accessibility and functionality of assistive technology, and appropriate methods to secure and utilize assistive technology in order to maximize the independence and participation of individuals with disabilities in society.

The combination of significant recent changes in federal policy (including changes to section 508 of the Rehabilitation Act of 1973 [29 U.S.C. 794d], accessibility provisions of the Help America Vote Act of 2002 [42 U.S.C. 15301 et seq.], and the amendments made to the Elementary and Secondary Education Act of 1965 [20 U.S.C. 6301 et seq.] by the No Child Left Behind Act of 2001) and the rapid and unending evolution of technology require a federal/state investment in state assistive technology systems to continue to ensure that individuals with disabilities reap the benefits of the technological revolution and participate fully in life in their communities.

Here are some examples of state assistive technology programs:

**Iowa Program for Assistive Technology (IPAT)**

Access to information, training, and equipment is critical to making the right choices and actually using assistive technology. Between 2003 and 2004, IPAT provided 1,464 device loans, responded to over 1,000 information requests per month, and held over 190 training events to provide skill-development training to over 3,200 consumers and service providers. IPAT has a 14-year relationship with the Iowa Department of Education and the Area Education Agencies (AEA) AT Team. Last year, through a collaborative effort, regular education classroom teachers from each AEA were provided training and technical assistance in how to use text-reader software with study skills for not only students with IEPs, but for all students in their classrooms.

**Pennsylvania’s Initiative on Assistive Technology (PIAT)**

In program year 2003-04, Pennsylvania’s Initiative on Assistive Technology provided more than 10,000 consumers and family members, service providers, faculty, and others with presentations, device demonstrations, training events, and awareness-level activities related to the scope and potential of assistive technology for persons with disabilities and older Pennsylvanians. In SFY 2004, there were more than 5500 devices shipped from Pennsylvania’s Assistive Technology Lending Library (a program run by PIAT with state support in addition to some federal support) in response to almost 4000 individual requests for devices to “try before you buy” (including to more than 1100 first-time borrowers). In addition, almost $200,000 worth of “previously owned” equipment was either sold or donated to individuals with disabilities.
Oklahoma ABLE Tech

Oklahoma has the highest Native American population in the nation, with more than 252,000 tribal members. The rate of disability among Native Americans is approximately 22.6%. In 2003, OK ABLE Tech provided equipment demonstrations to 125 individuals, equipment loans to 185 individuals, and direct information and referral to 3,364 individuals.

Missouri Assistive Technology (MoAT)

Between 2003 and 2004 the MO TAP for Internet Program provided 1,168 adaptive computer devices representing over 160 different individual items. A majority of applicants (73%) received assistance with selecting their equipment, and (46%) received training on their equipment. Missouri is the only state in the nation whose telecommunications equipment distribution program, which is administered by MoAT, includes adaptive devices for Internet access. Consumers range in age from 2-90 and include a wide array of disabilities.

North Carolina Assistive Technology Program (NCATP)

In program year 2003-04, the North Carolina Assistive Technology Program provided technical consultations to 7,770 individuals including demonstration of equipment to help individuals select appropriate devices. 2,757 equipment loans for short-term tryout were made that year, and 1,321 people received assistive technology funding resource information and consultation.

North Dakota Interagency Program for Assistive Technology (IPAT)

From June 2003-May 2004, IPAT served 1,344 seniors through the SATS program, eliminating or delaying institutionalization for those state seniors 60 years or older.

“I am in fifth grade at Baldwin School. I have a learning disability in written language, which makes reading and spelling very hard. IPAT helped figure out what assistive technology might help me. I got my AlphaSmart and Franklin Language Master in December. I use them every day to do assignments and reports. I am able to complete some of my assignments by myself and don’t always need someone to write for me. Thank you IPAT Program”. Elementary school student - Baldwin, ND.

From June 2003-May 2004, the IPAT Technology Access Center (TAC) provided 50 AT assessments, 7 AT trainings, 18 demonstrations, and 16 teleconferences benefiting over 200 North Dakota consumers and service providers.

Virginia Assistive Technology System (VATS)

VATS has received federal funding from the National Institute on Disability and Rehabilitation Research since 1990 to develop a statewide comprehensive system of assistive technology (AT) and to assist Virginians with disabilities in accessing assistive and information technology (IT) devices and services. Some of their successes include:

- Supported passage of "The Virginia Assistive Technology Device Warranties Act." This act guarantees Virginians with disabilities who use devices the same protection that customers have for "lemon" automobiles.
- Established the Virginia Assistive Technology Loan Fund Authority (ATLFA), providing low-interest, guaranteed loans for the purchase of assistive technology.
  www.atlfa.org
- Formed an inter-state consortium with Tech Act Projects and the ADA Information Center in the Mid-Atlantic Region that received federal grant funds to ensure education-based information technology access.
- Collaborated with the Virginia Information Technology Agency on implementing Section 508 standards to ensure the accessibility of information technology.
- Produced valuable resource publications such as "Assistive Technology in the Student’s Individualized Education Program: A Handbook for Parents and School Personnel."
- Provided targeted AT workshops such as "Gadgets and Gizmos" that increased awareness of AT solutions, and enhanced independence and greater safety for aging Virginians.

References
