Assistive Technology

Clyne, M., Wolfe, J., Blaha, R., Hertzog, T. (2015)

What is Assistive Technology?

- Assistive technology (AT) is any kind of technology that enhances the functional independence of a person with a disability.
- AT can be anything from:
  - a simple (*low-tech*) device such as a magnifying glass to . . .
  - a complex (*high-tech*) device, such as a computerized communication system

Sources: Family Center on Technology and Disability, no date

What is Assistive Technology? (cont.)

- AT can be . . .
  - big (e.g., an automated van lift for a wheelchair)
  - or small (e.g., a grip attached to a pencil or fork by Velcro)
- AT can also be a substitute for something else, such as an augmentative communication device that provides vocal output for a student who cannot communicate with her own voice.

Sources: Family Center on Technology and Disability, no date.

What is Assistive Technology? (cont.)

- The Individuals With Disabilities Education Act (IDEA) requires school districts to provide a student with the assistive technology (AT) that he or she needs in order to receive a free and appropriate public education.
- Consideration of a student's need for AT occurs as part of the IEP process.

Sources: Wisconsin Assistive Technology Initiative, 2009

Using AT to Maximize Hearing and Vision

- This presentation provides an introduction to AT devices that can be used to maximize hearing and vision.
- In a future module, you will learn about additional types of AT.

The Role of the Intervener

Children who are deaf-blind typically have many AT devices

Transcript

The Role of the Intervener (cont.)

- Team members such as a teacher of students with visual impairments, a deaf and hard of hearing teacher, or a speech language pathologist, will instruct the student on the use of these devices.
- It is imperative, however, that the intervener become familiar with a student's devices and support their use throughout the day.

AT Devices for Maximizing Vision

Slant Boards

- Low tech devices such as reading stands or slanted workspaces can make reading and other near tasks much easier.
- They are especially helpful for students who have:
  - visual field loss from colobomas
  - additional physical difficulties

Reading Accommodations (cont.)

Reading guides or "windows" help the student focus on a specific area of text and keep him from losing his place as he reads.

Magnifiers

- Magnifiers are a key type of AT for maximizing vision.
- They are used to enlarge objects, images, and text.
- There are several different types of magnifiers, including:
  - hand-held magnifiers
  - video magnifiers
  - screen magnifiers

Hand-Held Magnifiers

Hand-held magnifiers can be used for a wide range of near vision tasks including:

- reading print
- looking at drawings or pictures
- looking at small objects (e.g., money, insects)

Hand-Held Magnifiers (cont.)

- Some types of hand-held magnifiers have a built-in light.
- Others can be mounted on a stand.
- Stand magnifiers provide a fixed distance between the lens and the reading material. This makes them easier for students who do not have sufficient strength and coordination to manage a hand-held magnifier on their own.

Source: Presley & D'Andrea, 2008, p. 29

Video Magnifiers

- Video magnifiers use a video camera to project an image onto a screen or monitor.
- They are also called:
  - closed-circuit televisions (CCTVs) or
  - electronic magnifiers

Audio Description and Transcript

Like hand-held magnifiers, video magnifiers have many uses. In this video, Tori and her teacher are working on a literacy activity.

Sources: AFB, 2014; Paths to Literacy, no date-a

Video Magnifiers (cont.)

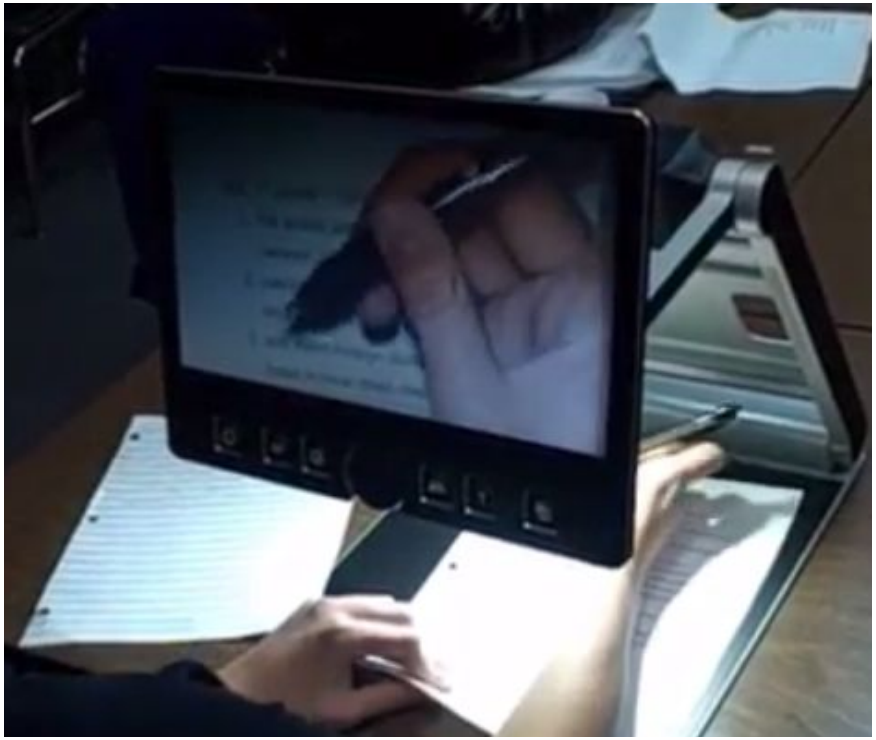
There are several types of video magnifiers including:

- desk-top
- hand-held
- portable

Video Magnifiers (cont.)

Features of video magnifiers (depending on the type and brand) include:

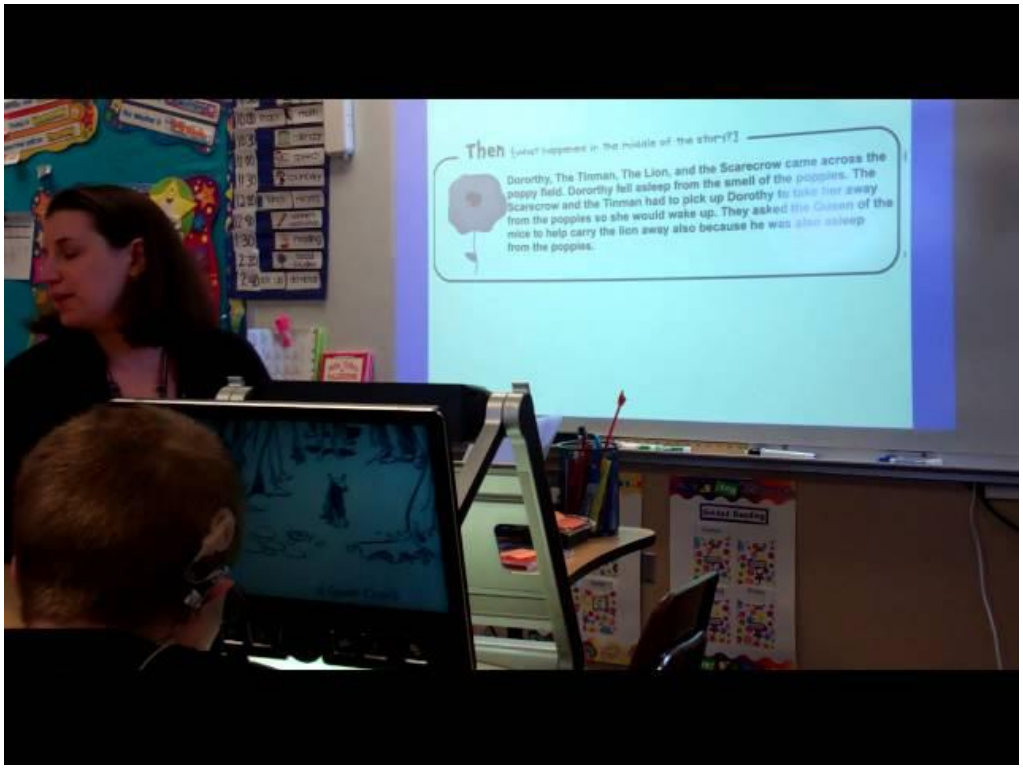
- a rotating camera--makes it possible for a student to see things near (e.g., on her desk) or at a distance
- line markers
- auto focus
- computer compatibility
- the ability to take pictures



Source: Huffman, 2012

Video Magnifiers (cont.)

- Ethan uses a video magnifier for reading.
- In this video, you will see his teacher pause at one point to allow Ethan to take a photo of an illustration from a book.
- He looks over the photo before the class moves on.



Audio Description and Transcript

Video Magnifiers (cont.)

- Distance-viewing functions of video magnifiers can also be achieved using other technology.
- In this photo, you see Jesse using a swivel camera attached to his laptop computer to get a closer view of the sign language interpreter.
- Students with deaf-blindness may need to shift gaze between interpreters, the board, and other information during instruction.

Screen Magnifiers

- A screen magnification program can be installed on the student's computer to magnify text and graphics.
- A screen magnifier works like a magnifying glass moving over the screen.
- Full-featured screen magnifiers magnify all screen items, including the mouse pointer, text cursor, icons, buttons, and title bars.

Source: AFB, no date-b

Telescopes

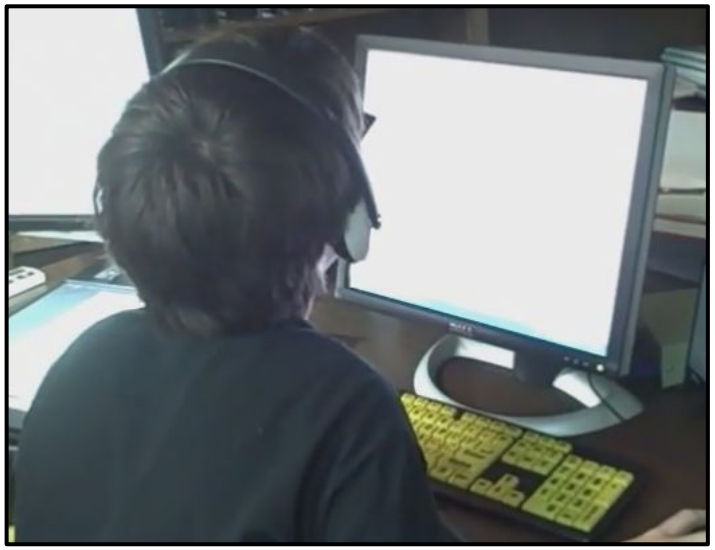
- While magnifiers primarily enhance near vision (with the exception of video magnifiers that have a swivel camera), telescopes enhance distance vision.
- They can be:
  - binocular or monocular
  - handheld or mounted in spectacle frames

A student using a hand-held monocular telescope.

Source: Presley & D'Andrea, p. 29

Computer Software and Hardware

- Computers are an essential instructional tool for all students.
- Fortunately, there are a wide range of devices that make computers accessible to students who are visually impaired.



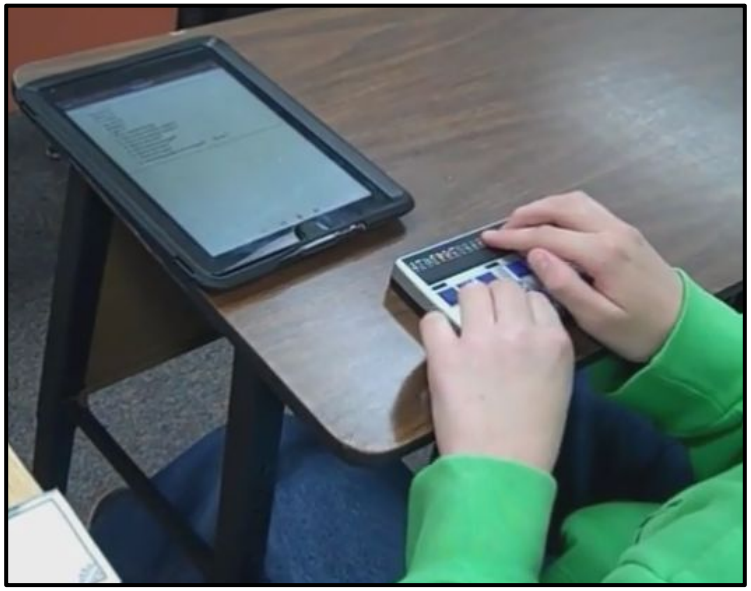
Computer Software and Hardware (cont.)

Adaptations to make computers more accessible include:

- Screen magnification software as described earlier.
- Accessibility features, already built into the computer, that can be used to improve contrast, reduce glare, and modify text size.
- Large monitors.
- Large-print keyboards.

Tablets

Tablets provide access to instructional materials through built-in zoom and speech features.



This student is using a tablet with a refreshable braille display.

Tablets (cont.)

- In this video, Blu and his SLP demonstrate how he uses his iPad.
- He uses an enlargement feature to increase picture size.
- He selects environmental sounds that are loud and low frequency.

Audio Description and Transcript

Braille Devices

- Although braille does not *maximize* vision, students with low vision may use braille in addition to print.
- By providing an alternate way to read, braille can prevent eye fatigue by giving a student a break from reading print.
- Braille may also be used to clarify visual information (e.g., a braille sign in a dim hallway).

Braille Devices (cont.)

Braille devices include both traditional braillers and electronic notetakers.

Perkins Brailler

Braille Notetaker

Using AT Vision Devices

Now that you have learned about some of the devices used to maximize vision, let's watch some students using them.

Video from Georgia Academy for the Blind

Transcript

Speech Programs

- You may have noticed in the previous video that some students used devices that provided auditory access (speech output) to written material.
- Text-to-speech and other speech programs are commonly used with students who are visually impaired.
- Depending on their type and level of hearing loss, however, students who are deaf-blind may not be able to understand or detect speech.

Speech Programs (cont.)

- Many new types of hearing aids or cochlear implants can be directly connected to computers with a cord, making speech features accessible to students with hearing loss.
- Similarly, many hearing aids are now able to connect wirelessly to computers, telephones, televisions, and other devices.

Braille Devices (cont.)

- All of the devices we have looked at so far were developed to support individuals with visual impairment.
- There are very few that take both hearing loss and vision loss into account.
- One exception is devices that support face-to-face communication, including:
  - DeafBlind Communicator
  - Screen Braille Communicator

This photo shows two people communicating using a Screen Braille Communicator. The person on the left is typing a message on the keyboard. A person with deaf-blindness, on the right, is reading it on a refreshable braille display. Source: AADB, 2009

AT Devices for Maximizing Hearing

Overview

The next section will introduce some of the most common assistive devices designed to help students maximize hearing in educational settings.

Devices to Help Students Hear Speech

- Soundfield and FM systems are designed specifically for speech sounds (e.g., teacher's voice, computer audio).
- They are typically used in noisy environments, such as classrooms, hallways, or community settings.

FM Systems

- FM (short for "frequency modulation") systems are like miniature radio stations operating on special frequencies.
- The system consists of a transmitter microphone used by a teacher or other speaker and a receiver used by the student.
- The receiver transmits sound directly to the student's ears, hearing aid, or cochlear implant.

Source: ASHA, no date-c

Sound-Field Systems

- Sound-field amplification systems consist of a wireless microphone worn by the teacher and one or more wireless receivers (small stereo) speakers placed around the classroom.
- They amplify the teacher's voice evenly across the classroom at a level higher than the background noise.

Source: Wilson et al, 2011

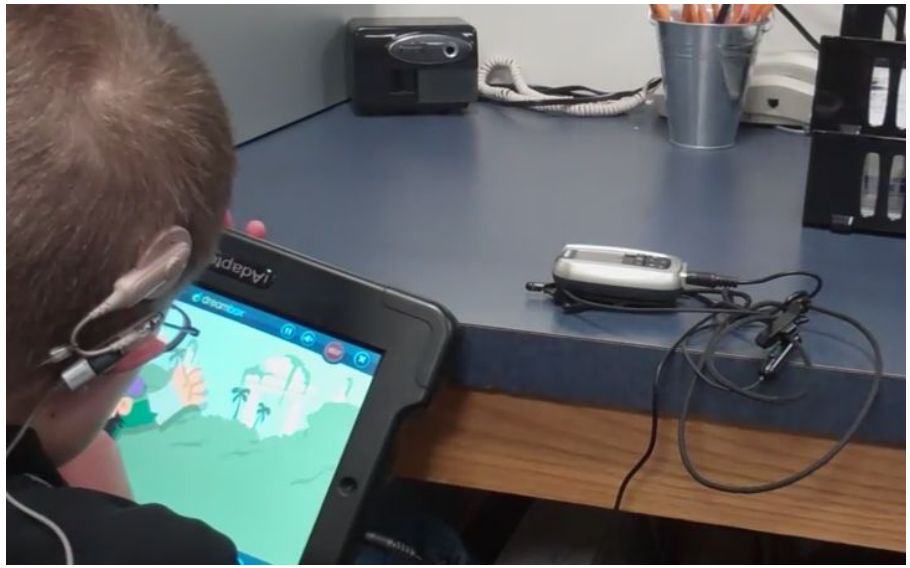
Syncing Assistive Listening and Speech Output Devices

- Advances in technology have produced amazing apps that use picture and text recognition to convert:
  - text to speech
  - images to speech
- For example, a person who is visually impaired can use a smartphone or tablet to take a photo of an object or text (e.g., a restaurant menu) and then hear it read or described.
- These apps and other technology, such as auditory textbooks, are becoming very common tools for students with visual impairments.

Syncing Assistive Listening and Speech Output Devices (cont.)

When using a speech output device with a student who is visually impaired ***and*** hard of hearing, it is essential to:

- assess the student's auditory comprehension of the speech output
- sync the speech output device to his assistive listening device (this can be done by an audiologist)



Ethan's FM system is synced to his iPad.

Captioning

- Captioning is the process of converting the audio content of a program (e.g., television broadcast, webcast, film) into text and displaying that text on a screen or monitor.
- Captioning enables individuals who are deaf or hard of hearing to have full access to media materials that otherwise would not be readily available.
- The print size of captions, however (usually about one-half inch on a 19-inch screen), and rate of presentation, may be difficult for a child with vision loss to see.

Source: Chenoweth, 2008

Real-Time Captioning

- Real-time captions are created and displayed at the time a program is occurring.
- For example, as a teacher lectures, the captioner types what the teacher is saying and the words are projected onto a screen.
- This is also know as communication access realtime translation or CART.

Source: Robson, 2008

Captioning Accommodations

- If a student is unable to access the print in captioning or CART at typical distances, she can try bringing the print closer by watching the captioned video or projected text on a personal computer.
- A student who is unable to access print, even at close distances, will need to have the audio interpreted into sign language.

Video Relay Service

- Video Relay Service (VRS) enables telephone communication between people who use sign language and people who use speech.
- Video equipment links the VRS user with an operator called a communications assistant (CA).
- The CA interprets signs into speech for the hearing person and speech into sign language for the deaf or hard of hearing person.

Source: Federal Communications Commission, 2012

Photo used courtesy Sorenson Communications

Alerting Devices

- Alerting devices use strobe lights, regular lights, or vibrations to alert a person with hearing loss that a sound has occurred.
- Examples of sounds they alert people to include:
  - fire alarms
  - alarm clocks
  - doorbell
  - knock at the door

Source: ASHA, no date-d

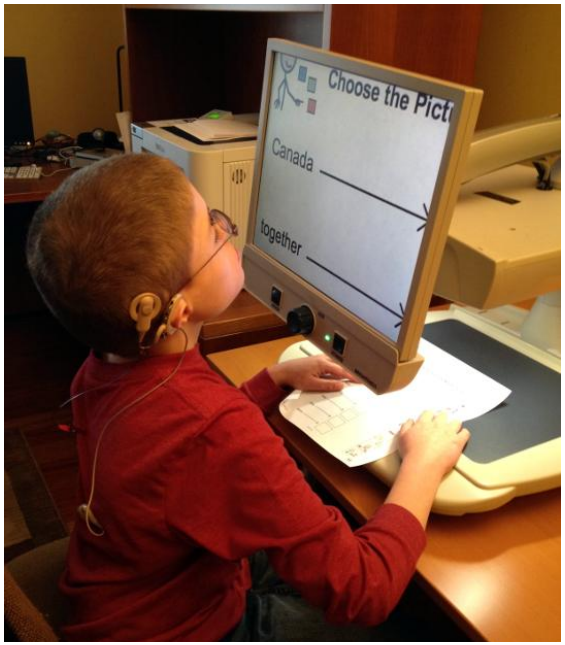
Accommodations for Alerting Devices

- A student who is deaf-blind may be unable to hear an alarm or see a flashing light, so have a plan in place in case of drills and true emergencies.
- Vibrating alarms can be used in place of flashing lights.
- If appropriate, teach the student that when you draw a large "X" on his back it means, "Emergency! Let me guide you and then I will explain."

General Information

AT at Home

- Many students need AT at home to complete assignments.
- The IEP team will determine which devices used in school are also needed at home.



Ethan using his video magnifier at home.

Maintenance and Troubleshooting

- AT devices require routine maintenance and, occasionally, troubleshooting.
- The IEP team will determine who is responsible for the care and maintenance of each device.

Transcript

Be Creative

Finding the best use of AT is often a creative team process in which interveners play a critical role.

Transcript

OHOA Deaf-Blind Intervener Learning Modules

A national resource designed to increase awareness, knowledge, and skills related to the process of intervention for students who are deaf-blind. Developed by National Consortium on Deaf-Blindness.

For more information, contact NCDB at info@nationaldb.org.

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