Learning Outcomes

- Recognize the most common personal needs for assistive technology associated with deafness or hearing impairment.
- Recognize appropriate technologies for people who are deaf or have a hearing impairment.
- Recognize appropriate technologies for people who have vision loss or blindness.
Hearing Technologies
Evaluating Hearing

Who:
• Audiologist
• ENT Physician

What:
• Auditory thresholds
  • Amplitude
  • Frequency
• Nature of impairment
  • Progressive
  • Non-progressive
Amplitude

Barely Audible, Whisper 10 dB
Watch Ticking 20 dB
Conversational speech 40-80 dB
Car horn nearby 100 dB
Power lawn mower 105 dB
Jackhammer 120 dB
Jet takeoff 130-150 dB
Stereo speakers > ???

Noise rated 80dB or higher, if heard for prolonged periods, can cause permanent damage to the hairs in the cochlea.
Frequency

Lowest piano key 27 Hz
Normal hearing 20 - 20,000 Hz
Conversational speech 250 - 4,000 Hz
Highest piano key 4,000 Hz
Goals of Hearing Technologies

• Communication
  • Improve social interaction
  • Improve speech articulation
  • Improve personal communication skills
• Ability to access information
  • Provide alternative feedback
  • Improve safety
Technologies for Deafness and Hearing Impairments
Technologies for Deafness

For personal communication
- Interpreters, sign language, lip reading
- Fax machines
- Telephone usage
  - TDD or TTY
  - Telecommunication Device for the Deaf
- Relay operators
- Internet
- Cochlear implants
- Texting
Technologies for Deafness

- Interpreters, sign language, lip reading
Telephones for Deafness

- Telecommunication Device for the Deaf (TDD)
- Text phones
Telephones for Deafness

Telecommunication Relay Services (TRS)

• 7-1-1 access

• Text Communication: Relay services can handle calls from traditional TTYs, TTYs with Turbocode™, computer modems (ASCII), as well as via Internet (IP relay)

• Video relay service

• Speech-to-speech service

• Voice carry-over

• Hearing carry-over
Technologies for Deafness

Internet, PDAs, Smartphones
- Text Messaging
- TTY option
- Freedom of Mobile Multimedia Access (FOMA)
Technologies for Deafness

Internet

• Signed Video Chat
• Video Cam
• Skype, Net Meeting
• Face Time
Cochlear Implant
Technologies for Deafness

- For access to audio information
- Closed-captioning of TV and video
Technologies for Deafness

- For access to audio information
  - Computer-Aided Real Time captioning
Technologies for Deafness

For access to audio information

• Captioning
Technologies for Deafness

For access to environmental sounds

- Audio-to-Visual Signaling Devices
- Audio-to-Vibrating Signaling Devices
- Service dogs
Technologies for Hearing Impaired
For personal communication
- Hearing Aids
Technologies for Hearing Impaired

For personal communication

• Hearing Aids
• Cell phone compatibility
Technologies for Hearing Impaired

Large Area Assistive Listening Systems

• Induction Loop Amplification
Technologies for Hearing Impaired: Personal Communication

Large Area Assistive Listening Systems
- Infrared Systems
- FM Assistive Listening Systems
Vision Technologies
Evaluating Vision

Who:
• Optician
• Optometrist
• Ophthalmologist
• Neuro- Ophthalmologist
• Occupational Therapist
• Mobility Trainer

What:
• Visual acuity
• Field
• Tracking
• Scanning
• Function
• Perception
• Orientation and mobility skills
Vision Impairments

Visual acuity impairments
- Size of the object
- Contrast
- Pattern frequency
Vision Impairments

Oculomotor control impairments
• Tracking and scanning
• Disjunctive eye movements
• Diplopia
Problems Caused by Vision Impairments

• Access to Information
• Orientation & Mobility
  • Distance between objects (depth perception)
  • Determining position in space
  • Navigation between locations
• Activities of Daily Living
• Recreation
Goals of Vision Technologies

• Provide access to information & reading
• Enhance writing ability
• Independence in orientation and community mobility
• Independence in activities of daily living
• Allow participation in recreational activities
Strategies for Compensation

- To enhance visual acuity
  - Enlarge the object
  - Increase illumination
  - Increase contrast

- To improve visual control
  - Reduce speed
  - Reduce depth of field
  - Enlarge target size
  - Glasses with prism lenses or patch
Technologies for Blind

For Reading
• Recorded audio materials
• Braille
• Electronic Reading Machines
• Optical Character Recognition, Screen Readers
• WWW with speech and Braille displays

For Writing
• Typewriter
• Computer
• Braille Embossers
• Portable Braille notetaker
Technologies for Blind

Cell phone use - Access Features

• Comprehensive voice output of information on the visual display
• Audio alerts, e.g. tones to indicate critical information
• Accessible input and controls
  • Voice control
• Displays with enhanced accessibility for individuals with some usable vision
Technologies for Blind

• Audio
Technologies for Blind

• Braille
Technologies for Blind

Braille Embossers and Printers
Technologies for Blind

• Refreshable Braille notetaker
• Voice activated organizer
Technologies for Blind

- Electronic Reading Machines (Kurzweil)
- Optical Character Recognition, Screen Readers
Technologies for Blind

For Writing

• Computer
• Screenless laptops
• Speech Synthesizer
• Tactile graphics
Technologies for Blind

Web Accessibility

- Users' technology
- Screen readers
- Special browsers
  - IBM Home Page Reader
- Screen magnification for those with some sight
Technologies for Blind

Web Accessibility

• Web Design
  • Label graphics and images (Alt text)
• Images of text versus text
• Label the structure
• Label links
• Minimize JAVA, JAVA Script
Technologies for Blind

For Orientation & Mobility

• Long-canines
• Dog-guides
Technologies for Blind

For Orientation & Mobility

- Long-canines
- Dog-guides
- Electronic Travel Aids
- Accessible Signage
Technologies for Blind
For Orientation & Mobility
• Braille compass
• Talking compass
Technologies for Blind

For Orientation & Mobility

- BrailleNote GPS
- Trekker
- Digital maps
Technologies for the Blind

For recreation
• Games, cards
• Sports
Technologies for the Blind
For Activities of Daily Living
• Talking Appliances
• Tactile Labels
Technologies for Low Vision

For Reading

• Large-Print Materials
• Optical Magnifiers
• High-Illumination Lamps
• Closed-Circuit Televisions (CCTV)
Technologies for Low Vision

For Writing

- High illumination
- Contrast script against surface
- Computer
Technologies for Low Vision

For orientation & mobility

- Monoculars & Binoculars
- Cameras
- Flashlights
- Night Vision Goggles
Technologies for Low Vision

For Daily Living and Recreation

- High illumination
- Large-Character Labels
- Large-Character books, magazines, games
- Optical Magnifiers
Technologies for Low Vision
For Daily Living and Recreation

Bar code reader
Review Questions  (feel free to discuss with your neighbors)

1. The most common personal needs for assistive technology by individuals with hearing impairment of deafness, include all of the following, EXCEPT:
   a. Improved social communication  
   b. Access to auditory information  
   c. Devices to improve memory and retention  
   d. Concerns for safety

2. Appropriate technologies for individuals with hearing impairment or deafness include all of the following, EXCEPT:
   a. Computer screen reader software  
   b. Visual signaling devices  
   c. Text messaging for smartphones  
   d. Captioning software for video and TV

3. Appropriate technologies for individuals with vision loss or blindness include all of the following, EXCEPT:
   a. Audio amplification to aid recall and retention for verbal instructions.  
   b. Screen reader software for computer access  
   c. Navigational aids (including GPS) for travel and mobility  
   d. Audio translation for text files
Review Questions  (Here are the answers. How did you do?)

1. The most common personal needs for assistive technology by individuals with hearing impairment of deafness, include all of the following, EXCEPT:
   a. Improved social communication
   b. Access to auditory information
   c. Devices to improve memory and retention
   d. Concerns for safety

2. Appropriate technologies for individuals with hearing impairment or deafness include all of the following, EXCEPT:
   a. Computer screen reader software
   b. Visual signaling devices
   c. Text messaging for smartphones
   d. Captioning software for video and TV

3. Appropriate technologies for individuals with vision loss or blindness include all of the following, EXCEPT:
   a. Audio amplification to aid recall and retention for verbal instructions
   b. Screen reader software for computer access
   c. Navigational aids (including GPS) for travel and mobility
   d. Audio translation for text files
Questions ?
The End

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- You must successfully pass a quiz based on the course’s learning outcomes. The quiz has 28 multiple-choice questions; you must answer 20 questions correctly to pass. If you do not pass the quiz, you must wait two days before reattempting the quiz.

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Within 2 weeks of your passing the quiz and completing the evaluation survey, RESNA will email your CEU transcript for the course.
If you have questions later...

You may contact today’s instructors.
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Jill Sparacio  otspar@aol.com

For questions about CEUs, the evaluation survey, and the quiz, please contact RESNA’s Education Manager:

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Thank you!