Characteristics of Computer Access Technology

Learning Outcomes
- To identify technologies for adapting standard input and output devices
- Identify alternatives to using standard input and output devices
- Identify performance enhancers for computer access

Learning Objectives, cont.
- To identify alternatives technologies to using a standard mouse
- To identify performance enhancers for computer access
- To identify alternative output options
Computer Components

- Processor (CPU)
- Memory
- Memory storage devices
- Input devices
- Output devices

Operating Systems

- Microsoft Windows
- Mac OS X
- Linux
- Unix
- Android
- iOS
- Windows Phone

Applications

- Word-processing
- Databases
- Spreadsheets
  - Personal finance managers
- Graphics
Applications, cont.

- Communications
- Internet
- E-mail
- Social Networking
- Games
- Instructional

Computer Access Strategies

- Workstation positioning/ergonomics
- Adaptations and alternatives to the standard keyboard
- Adaptations and alternatives to the standard mouse
- Adaptations to the standard monitor
- Alternative computer outputs
- Performance enhancements

Workstation positioning/ergonomics
Adaptations to the Standard Keyboard

Operating System Adjustments

Accessibility in Windows 10

Apple OS X Accessibility

Operating System Adjustments/Software

• StickyKeys - latch modifier keys
• FilterKeys - ignore brief & repeated presses
• ToggleKeys - hear tones with locking keys
• Keyboard speed - adjust repeat rate & delay
• Alternative keyboard layouts

Change Keyboard Layout

• Standard layout is QWERTY
• Dvorak
• Right-handed Dvorak
• Left-handed Dvorak
• Chubon
Change Keyboard Layout

![Image of Change Keyboard Layout for Windows 8 and 10]

Alternative Keyboard Arrangements

<table>
<thead>
<tr>
<th>Dvorak</th>
<th>Left Hand Dvorak</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 0 ]</td>
<td>= - / p f m l j 4 3 2 1</td>
</tr>
<tr>
<td>, . y f g c r l / = \</td>
<td>q b y u r s o . 6 5</td>
</tr>
<tr>
<td>a o e u i d h t n s - ;</td>
<td>k c d t h e a z 8 7</td>
</tr>
<tr>
<td>q j x b m w v z</td>
<td>‘ x g v w n i , 0 9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Right Hand Dvorak</th>
<th>Chubon for one pointer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 j l m f p / = -</td>
<td>[ ] 3 2 1 v u p 6 7 8</td>
</tr>
<tr>
<td>5 6 q . o r s u y b ;</td>
<td>- 4 q m i t s c k z 9 :</td>
</tr>
<tr>
<td>7 8 z a e h t d c k</td>
<td>5 j g n r e h b y x 0</td>
</tr>
<tr>
<td>9 0 x , i n w v g ’</td>
<td>/ ‘ f o a d l w . ,</td>
</tr>
</tbody>
</table>

Adaptations to the Standard Keyboard: Control Stabilizers

Keyguards
- Provides stability to the hand
- Facilitates finger isolation

![Image of Keyguards]
Adaptations to the Standard Keyboard: Control Stabilizers

- Wrist rests
  - Provide stability
  - Increases endurance

Adaptations to the Standard Keyboard: Control Extenders

- Hand pointers, dowels, pencils
- Headpointer, headwand
- Mouthstick

Alternatives to the Standard Keyboard

- Alternative keyboards
- Speech recognition
- Onscreen keyboard
- Scanning
- Coded access (i.e., Morse Code)
Alternative Keyboards

• Split and Tent keyboard
• Mini keyboard
• Chorded keyboard

Characteristics of Speech Recognition

• Direct selection
• Requires consistent speech
• Requires visual monitoring
• Not for all environments
• Cognitively demanding
• Requires training

Keyboard Alternatives: Onscreen keyboard

Onscreen keyboards can be accessed via a mouse or through switch scanning
Scanning

Scanning onscreen keyboard for switch access

Morse code

Adaptations to the Standard Mouse

- Mouse adjustments
- Tracking Speed
- Click
- MouseKeys
- Keyboard equivalents
Alternatives to the Standard Mouse

- Trackball
- Joystick mouse
- Touch pad
- Touch screen, touch window
- Head mouse
- Eye gaze
- Scanning, Morse Code, Voice

Alternatives to the Standard Mouse

Head Mice

- Translate movement of the head into cursor movement
- Can often be used with speech generating devices

Characteristics of Eye Gaze

- Direct selection
- Lower cost over the years
- Generally requires stable positioning
Alternatives to Standard Clicking

Switches
- Require switch interface or switch adapted mouse

Scanning
Mouse Point and Click

Typing Injuries

Typing Injury Frequently Asked Questions
http://www.tifaq.com/
Computer Access Performance Enhancement

- Word prediction/word completion
- Abbreviation expansion
- Macros

Word Prediction/Completion

THE RE
- 1 REST
- 2 RESNA
- 3 REAL
- 4 REALLY

Abbreviation Expansion

asap
Fundamentals in Assistive Technology
Computer Access

Macros

Office 2013 Screenshot

Abbreviation-Expansion
ShortKeys

MacroExpress
www.macros.com US$40

Abbreviation-Expansion
ShortKeys www.wintools.com US$25
Monitor Adjustments
For persons with low vision
- Font size/color
- Background color
- Mouse pointer size
- Screen enlargers
- Contrast adjustment
- Sound sentry / show sounds

Windows Magnifier

Windows High Contrast
Change Mouse Pointer Size

Sound Sentry

Output Alternatives

For persons with no vision
- Speech/screen readers
- Keystroke echoing
- Braille
Computer Access

- Many access methods available
- Many things to consider
  - Input method characteristics
  - User needs and abilities

Questions?