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

Office
office.com

OpenOffice
openoffice.org

Adobe
adobe.com
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

Accessibility in Windows 10

Apple OS X Accessibility

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

wiki.gnome.org/Accessibility
apple.com/accessibility/osx
Microsoft.com/enable
Change Keyboard Layout

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

Changing the Keyboard Layout for Windows 8 and 10
Alternative Keyboard Arrangements

**Dvorak**
1 2 3 4 5 6 7 8 9 0 [ ]
‘ , . p y f g c r l / = \n a o e u i d h t n s - ; q j k x b m w v z

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

**Right Hand Dvorak**
1 2 3 4 j l m f p / - =
5 6 q . o r s u y b ;
7 8 z a e h t d c k
9 0 x , i n w v g ‘

**Chubon for one pointer**
‘ [ ] 3 2 1 v u p 6 7 8 = \n- 4 q m i t s c k z 9 :
5 j g n r e h b y x 0
/ ‘ f o a d l w , .
Adaptations to the Standard Keyboard: Control Stabilizers

Keyguards

• Provides stability to the hand
• Facilitates finger isolation
Adaptations to the Standard Keyboard: Control Stabilizers

Wrist rests

- Provide stability
- Increases endurance

[Images showing wrist rests in use]

alimed.com

eroguys.com

RESNA
Rehabilitation Engineering and Assistive Technology Society of North America
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)

7tutorials.com
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

- First single switch access solution for Mac OS X
- Full mouse and keyboard emulation
- Works seamlessly with all standard applications
# Morse code

<table>
<thead>
<tr>
<th>Letter</th>
<th>Morse Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>-- -</td>
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<tr>
<td>b</td>
<td>--- o</td>
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<tr>
<td>c</td>
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<td>l</td>
<td>0 y</td>
</tr>
<tr>
<td>m</td>
<td>* z</td>
</tr>
</tbody>
</table>

### Keys

**Space** --- **Shift** ---** Enter** --- **Ctrl** --- **BackSpace** --- **Alt** --- **F1** --- **F6** --- **F11** --- **F12** ---

- **ArwUp** --- **PgUp** --- **F4** --- **F9** ---
- **ArwDw** --- **PgDn** --- **F5** --- **F10** ---
- **ArwLt** --- **Home** ---
- **ArwRt** --- **End** --- **Ctrl-Alt-Del** ---

**Repeat** --- **NumLock** --- **Esc** --- **PrtScr** --- **Hold/Rel** --- **ScrLock** --- **INSert** --- **TabFw** --- **Win Group** --- **CapsLock** --- **DELETE** --- **TabBw** ---

[Image: westest.com]

[Image: orin.com]
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

blenetinc.com/

infogrip.com
Scanning
Mouse Point and Click

The line comes down,
↓ the finger goes across ↓

Use a single switch/key to control both,rjcooper.com
Typing Injuries

Typing Injury Frequently Asked Questions
http://www.tifaq.org/
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
Macros

Office 2013 Screenshot
MacroExpress

www.macro.com US$40
Abbreviation-Expansion

![Image of ShortKeys software interface](image-url)
Monitor Adjustments

For persons with low vision

- Font size/color
- Background color
- Mouse pointer size
- Screen enlargers
- Contrast adjustment
- Sound sentry / show sounds

Change the Size of Text and Icons

Windows 8 Screenshot
Windows Magnifier

[Image: A screenshot of the Windows Magnifier app in Windows 8, illustrating how to enable the Magnifier feature through the Ease of Access Center.]

Not sure where to start? Get recommendations to make your computer easier to use.

Explore all settings
When you select these settings, they will automatically start each time you sign in.

Window 8 Screenshot
Windows High Contrast

High Contrast Black in Windows 8
Change Mouse Pointer Size

Windows 8 Screenshots
Sound Sentry

Use text or visual alternatives for sounds
When you select these tools, they will automatically start each time you sign in.

Use visual cues instead of sounds

☐ Turn on visual notifications for sounds (Sound Sentry)

Choose visual warning

☐ None
☐ Flash active caption bar
☐ Flash active window
☐ Flash desktop

☑ Turn on text captions for spoken dialog (when available)

See also

Audio Devices and Sound Themes
Learn about additional assistive technologies online

Windows 8 Screenshot
Output Alternatives

For persons with no vision

- Speech/screen readers
- Keystroke echoing
- Braille

VoiceOver in Yosemite

abilitynet.org
Computer Access

• Many access methods available
• Many things to consider
  • Input method characteristics
  • User needs and abilities
Review Questions  (feel free to discuss with your neighbors)

1. A keyguard is used to:
   a. Enlarge individual keys for easier visual regard
   b. Enlarge individual keys for easier access
   c. Prevent moisture from damaging the keyboard
   d. Provide stability to the hand and promote finger isolation for key activation

2. Which of the following alternative mice translates head movement into cursor movement?
   a. Head mouse
   b. Trackball
   c. Joystick mouse
   d. Touch screen

3. Increasing the size of the font and mouse pointer on the monitor would be helpful for a client with:
   a. Impaired fine motor skills
   b. Low vision
   c. Impaired depth perception
   d. No vision
Review Questions  (Here are the answers. How did you do?)

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   b. Enlarge individual keys for easier access
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Questions?