

Boston Children's Hospital
Until every child is well



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

A Mouse by any Other Name

OT access considerations for people with ALS

Peggy Dellea, MS, OT/L
ALS – Alternative Communication Program
Boston Children's Hospital



Boston Children's Hospital
Until every child is well



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Occupational Therapy / Assistive Technology

- ❖ Access Consideration
 - ❖ **Activity Goal**
 - ❖ Access site
 - ❖ Access method
 - ❖ Access settings
 - ❖ Real life use
 - ❖ Preparing for the next access site





How the customer explained it.



How the project leader understood it.



How the analyst designed it.



How the programmer wrote it.



What the customer really wanted.



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Activity Goal

- ❖ OT related – includes activities of daily living (non-communication, non-computer)
- ❖ Communication –
 - ❖ Relay quick messages – wants/needs
 - ❖ Relay novel messages
 - ❖ Participate in conversation
 - ❖ People with ALS have a lifetime of fast, sophisticated, multimodal communications



Activity Goal

- ❖ Computer –
 - ❖ Email
 - ❖ Facebook
 - ❖ Word Processing
 - ❖ Spreadsheet (often work-related)
 - ❖ Internet
 - ❖ Games
 - ❖ Movies/videos/music
 - ❖ Reading
- ❖ Smart phone or iPad
 - ❖ Phone
 - ❖ Text
 - ❖ Email
 - ❖ Games
 - ❖ Music
 - ❖ Reading



The activity goal drives the process. Other important considerations:

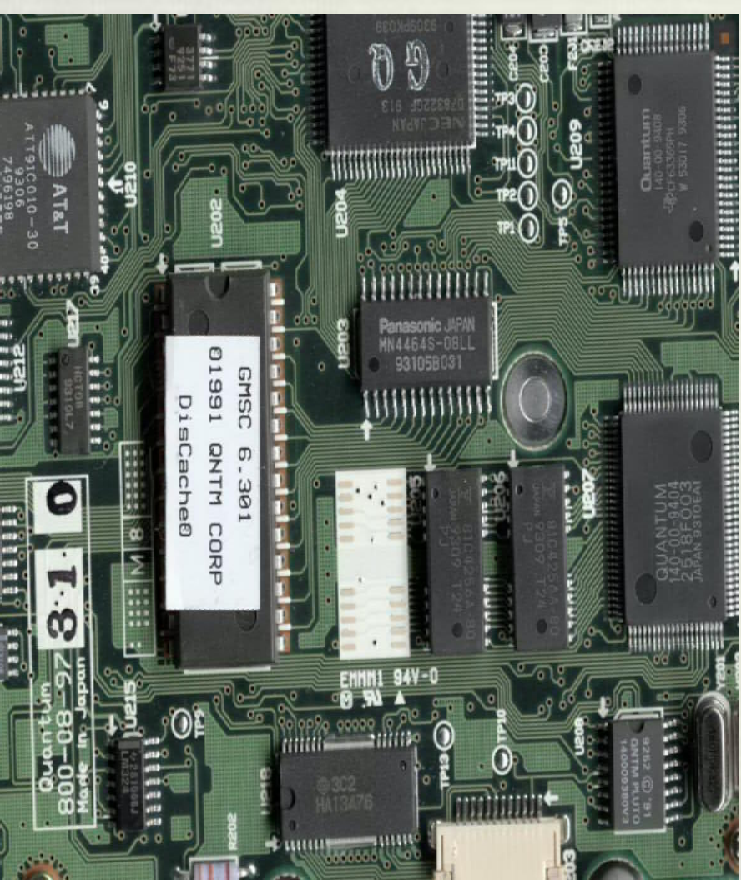
- ❖ Technology availability
 - ❖ Computer at home? PC? Mac?
 - ❖ Casual user or computer whiz?
 - ❖ Somebody nearby to troubleshoot?
- ❖ Motor Control available
 - ❖ Hands? Head? Foot?
- ❖ Speech available
 - ❖ Intelligible?
 - ❖ Breath Support?
 - ❖ Fatiguing?



LOW Tech vs.



HIGH TECH



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Physical Access Control Site assessment

- ❖ Direct selection
 - ❖ Preferred method – if possible
 - ❖ Positioning/ mounting
 - ❖ Adaptive stylus
 - ❖ Computer adjustments
- ❖ Indirect selection
- ❖ Best control site (s)
 - ❖ Head, eyes, mouth, tongue, respiratory (sip/puff), voice, chin, shoulder, trunk, arm/hand, leg, knee, foot.
 - ❖ Pressure, excursion, range



Considerations for access selection:

- ❖ Motor control that is reliable and repeatable
- ❖ Motor control that is fine-tuned
- ❖ Include eye control and voice production
- ❖ Exploit the strengths and circumvent the weakness
- ❖ the range and control of movement
- ❖ the amount of training and practice required to use
- ❖ the short and long-term costs/benefits of using access method



“He cannot use a
computer. We have
tried everything. He
can't use his hands.”



Boston Children's Hospital
Until every child is well



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

“I have ceded to the
disease and now I type
with one hand.”

NO. You are not giving into to the disease. You
are outsmarting the disease and getting the job
done another way.



Boston Children's Hospital
Until every child is well



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Direct Selection

- ❖ Touch screen (iPad for example)
 - ❖ Not pressure sensitive – capacitive
 - ❖ Skin (not fingernail), capacitive tip stylus
 - ❖ Timing matters – longer touch results in different action
 - ❖ One point of contact
 - ❖ Cannot drag across the screen
 - ❖ Reposition to be near body, add stylus





Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Home made access



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Computer Access



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Direct Selection Keyboard

- ❖ Small keyboard
- ❖ Close to body
- ❖ Support arms / wrists
- ❖ Typing aid (pointer)
- ❖ Type with one hand
- ❖ Keyboard Adjustments – sticky keys and filter keys





Small keyboards –

- One-handed use – easier to reach all keys
- Easy to position close to the body
- Can position a mouse close by

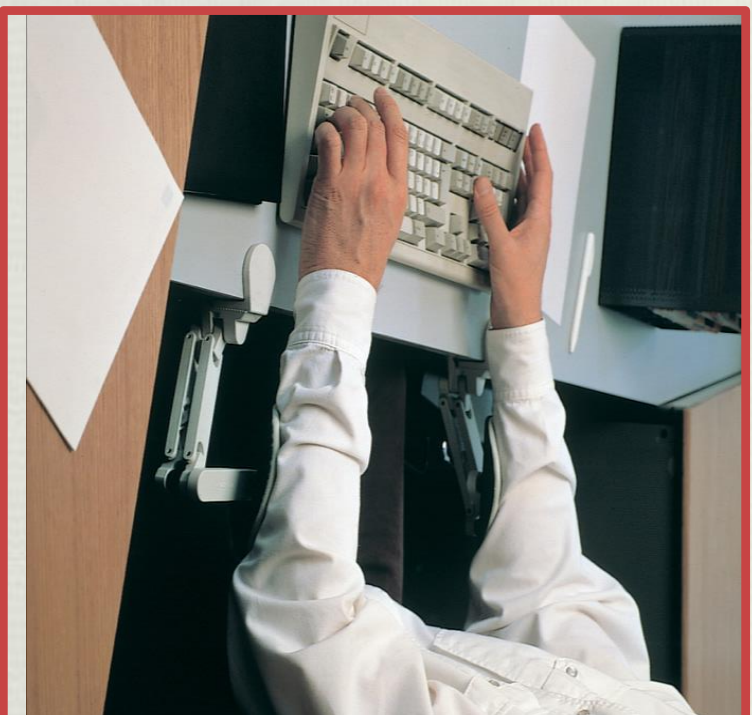


Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

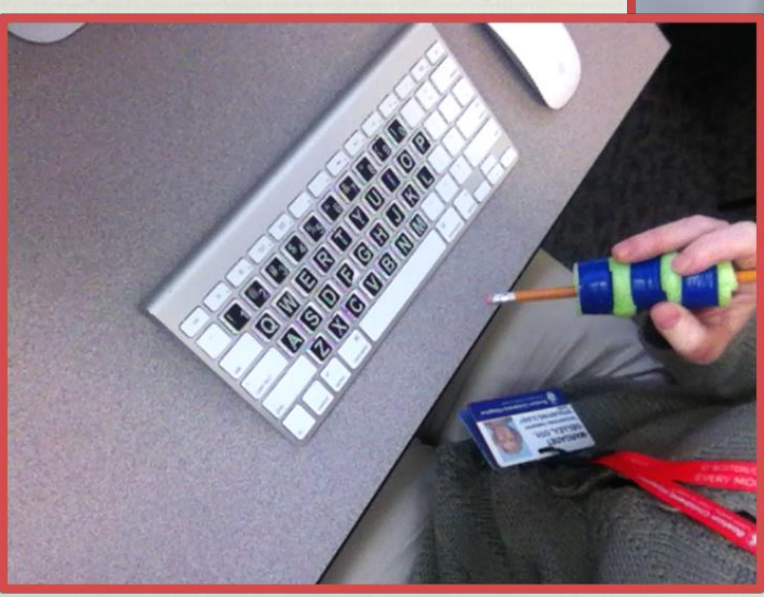
Arm support
Decreases work load of shoulders and elbows
Supports weight of the arms



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL



Typing Aid

Allows accurate and fast typing with limited finger control

Keeps your fingers above the keyboard

Consider ease of donning/doffing

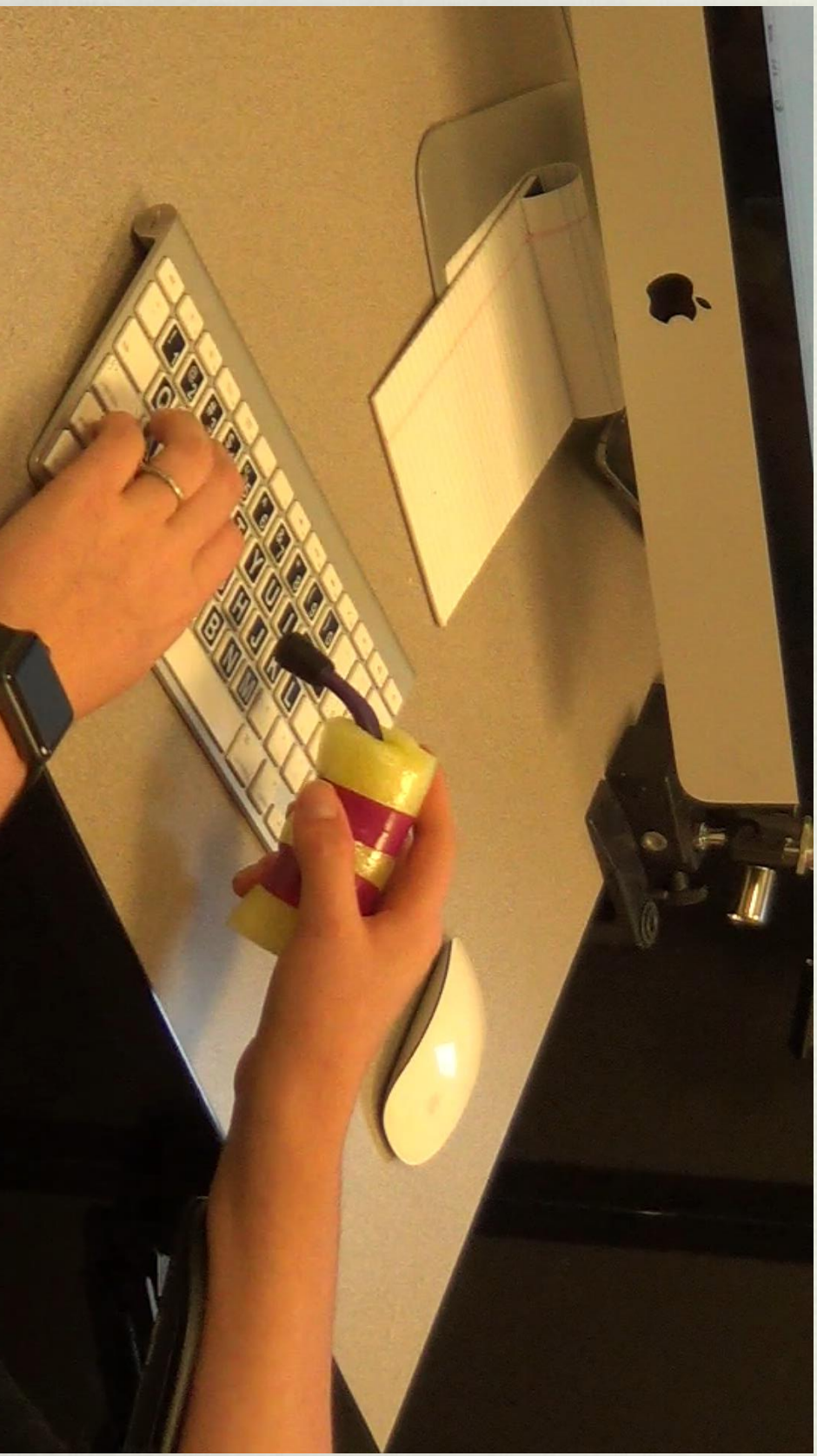


Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Typing aid on one hand, touch typing with the other?



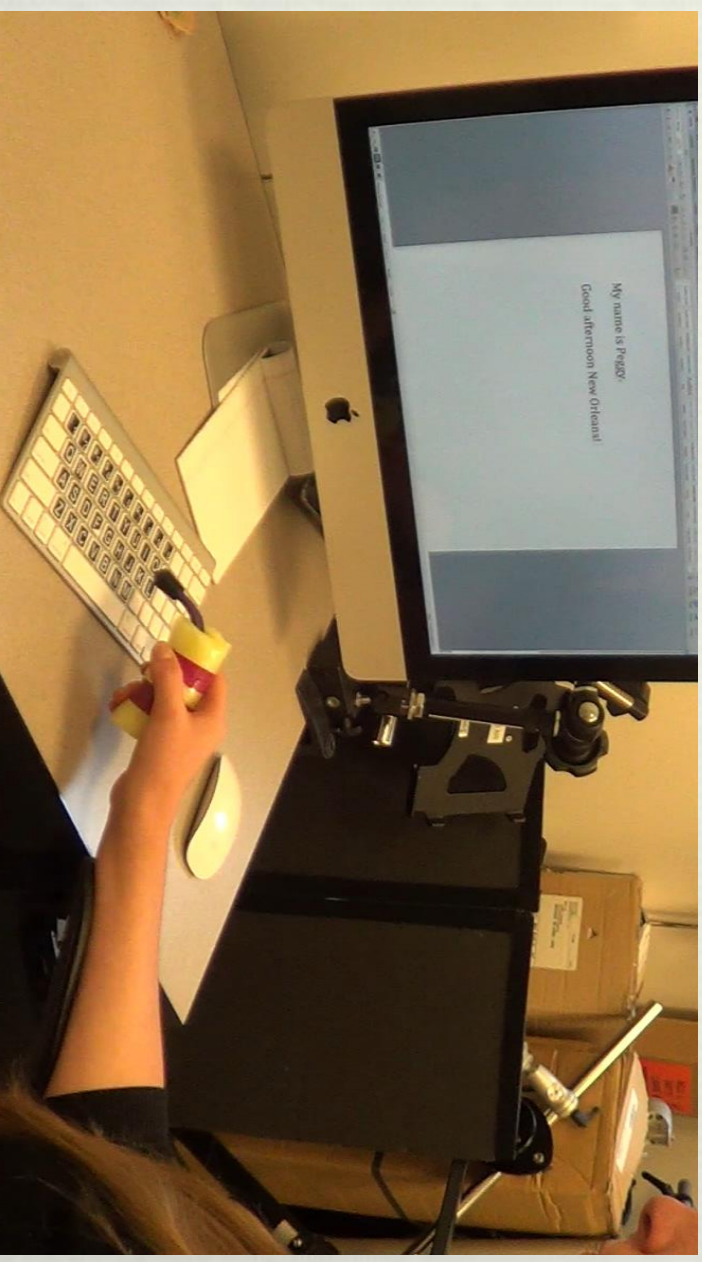
Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Keyboard adjustments

- ❖ Sticky keys
- ❖ Allows the user to type keys in a row
- ❖ Designed for one-handed typing
- ❖ Great for poor coordination
- ❖ Press the shift key five times to turn on



Keyboard Adjustments



- ❖ Filter Keys
- ❖ Adjusts for tremor or for holding the keys down too long
- ❖ Can add key click for auditory feedback
- ❖ Hold the right shift key for 8 seconds to turn on

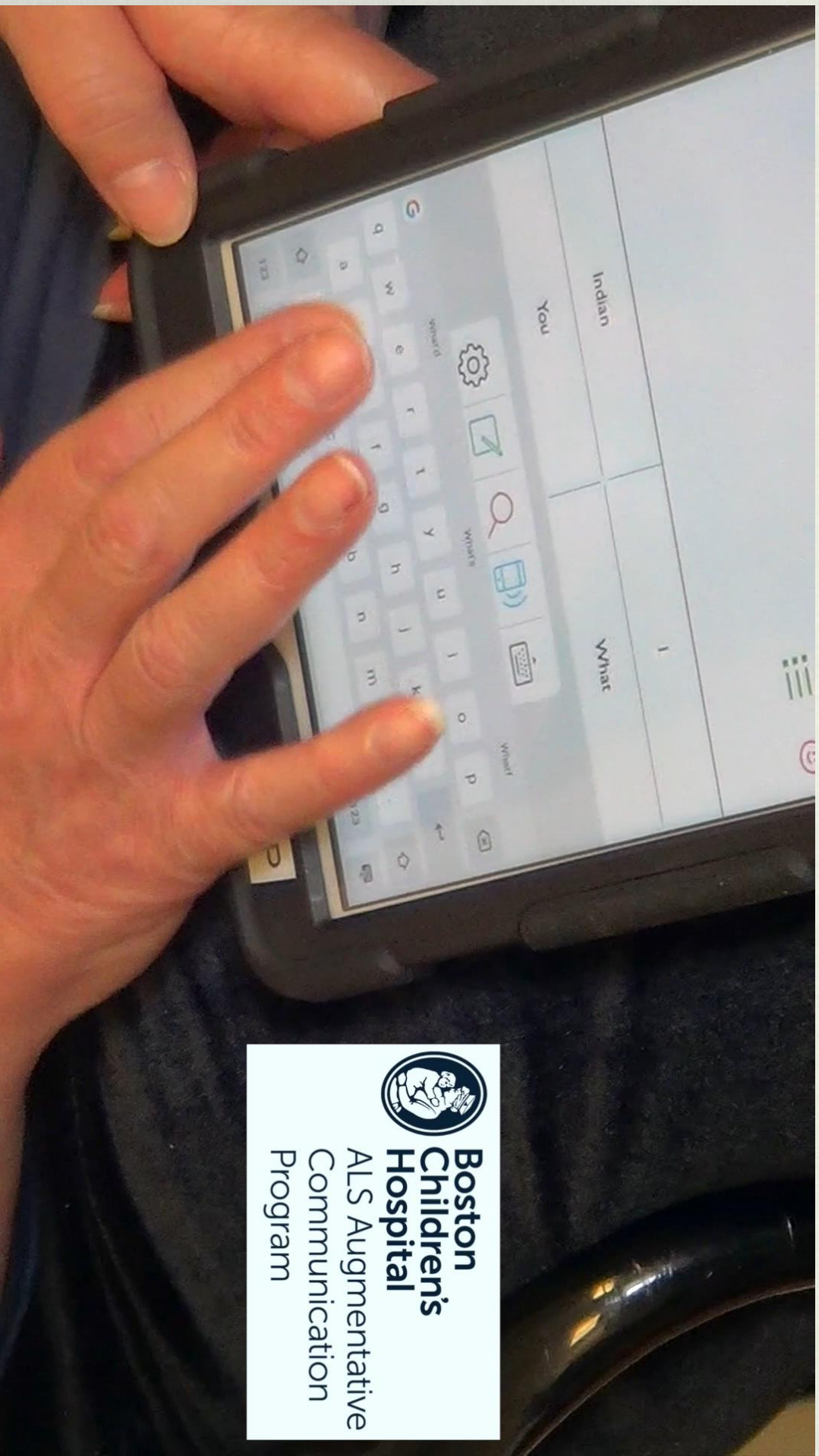


Direct selection touch screen

- ❖ Position device close to body
- ❖ Support arm
- ❖ Consider stylus – keeps fingers away from the screen, may improve accuracy
- ❖ Consider vertical vs. horizontal orientation
- ❖ Consider swipe –
 - ❖ Increase typing speed
 - ❖ Compensate for tremor/shakiness
 - ❖ Finger lift only between words



Swipe in action



**Boston
Children's
Hospital**
ALS Augmentative
Communication
Program



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Direct Selection: Mouse

- ❖ Problem – difficulty gripping the mouse, hard to move cursor across the screen, hard to hit the left mouse button, accidentally hitting the mouse buttons
- ❖ Solution – Trackball
 - ❖ Do not need to grip – can move the ball with any part of your hand
 - ❖ Trackball remains stationary – no reaching to move it
 - ❖ Buttons are separated from the mouse movement





- ❖ Problem – difficulty gripping the mouse, hard to move cursor across the screen, hard to hit the left mouse button, accidentally hitting the mouse buttons
- ❖ Solution – Hands-free Cursor control
 - ❖ Foot Mouse
 - ❖ Head Mouse

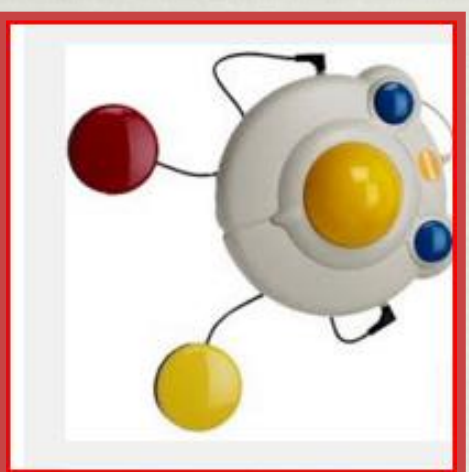


Foot Mouse

- ❖ Foot time mouse



- ❖ Trackball



Foot “mouse”



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Head Mice

- ❖ Origin Instruments
- ❖ Quah Zono
- ❖ Natural Point
- ❖ Tracker Pro



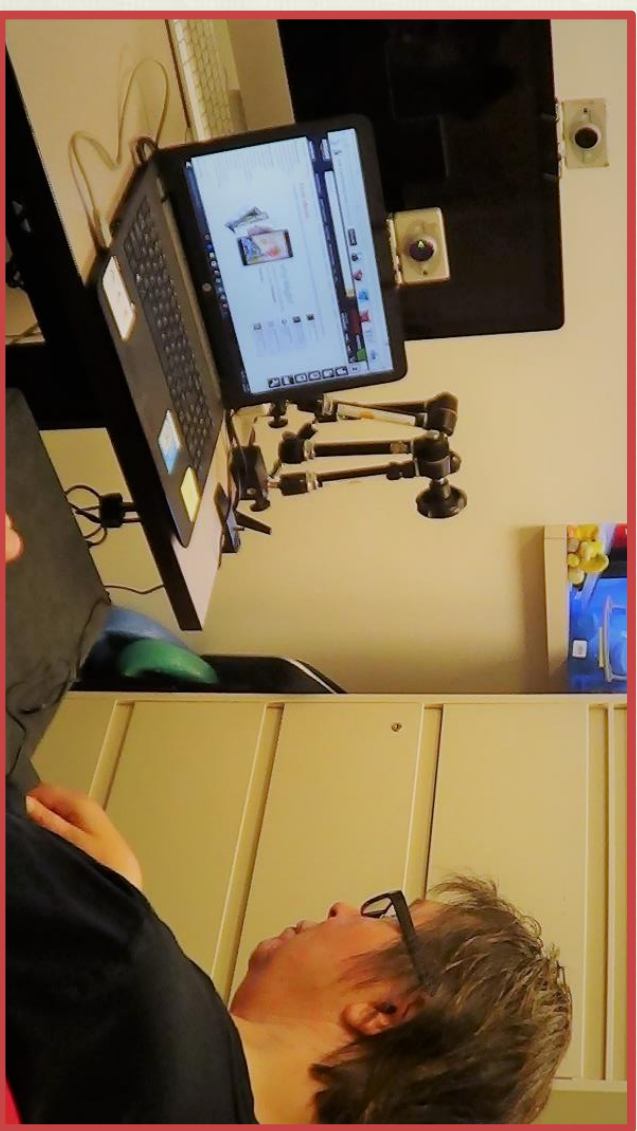
Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Head Mice

- ❖ All provide wireless cursor control
- ❖ All involve transmitter and receiver
- ❖ All require USB port (no Bluetooth yet)
- ❖ All require good head control
- ❖ Infrared devices require “line of sight”
- ❖ Quha Zono is gyroscopic – no line of sight required
 - ❖ Can be programmed to be used on hand or foot



- ❖ Head movement provides cursor control – need to add clicking function



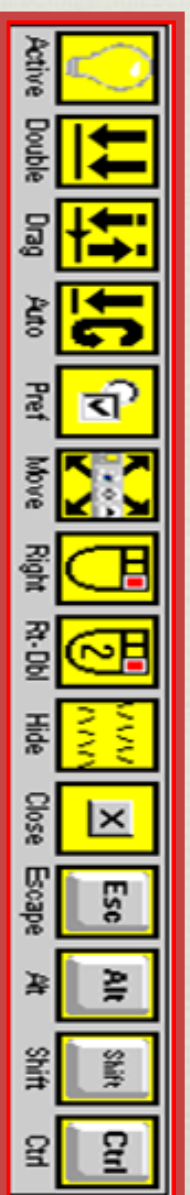
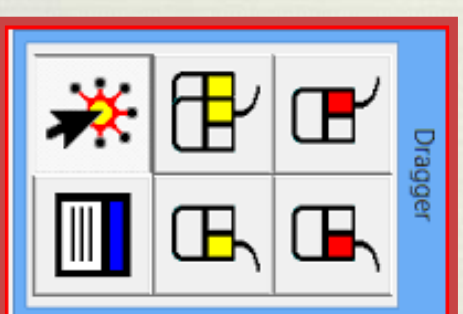
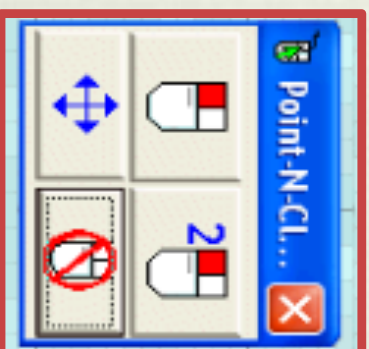
How do I click?

- ❖ Switch click
- ❖ Any reliable switch site – except for the head.
- ❖ Activates left click, double click, and drag



Switchless clicking

- ❖ Auto click dwell software
- ❖ Dragger
- ❖ Smart Click
- ❖ Point n Click



- Set the dwell time
- Set the jitter box
- Have a pause button



Head Mouse in Action



Boston Children's Hospital
Until every child is well™

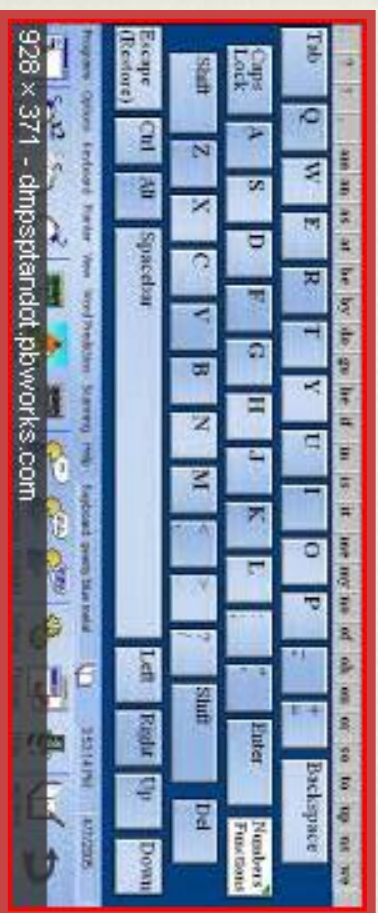


HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Mouse-only access

On Screen Keyboard

- ❖ Windows onscreen
- ❖ Onscreen
- ❖ Softype
- ❖ Reach Interface Author

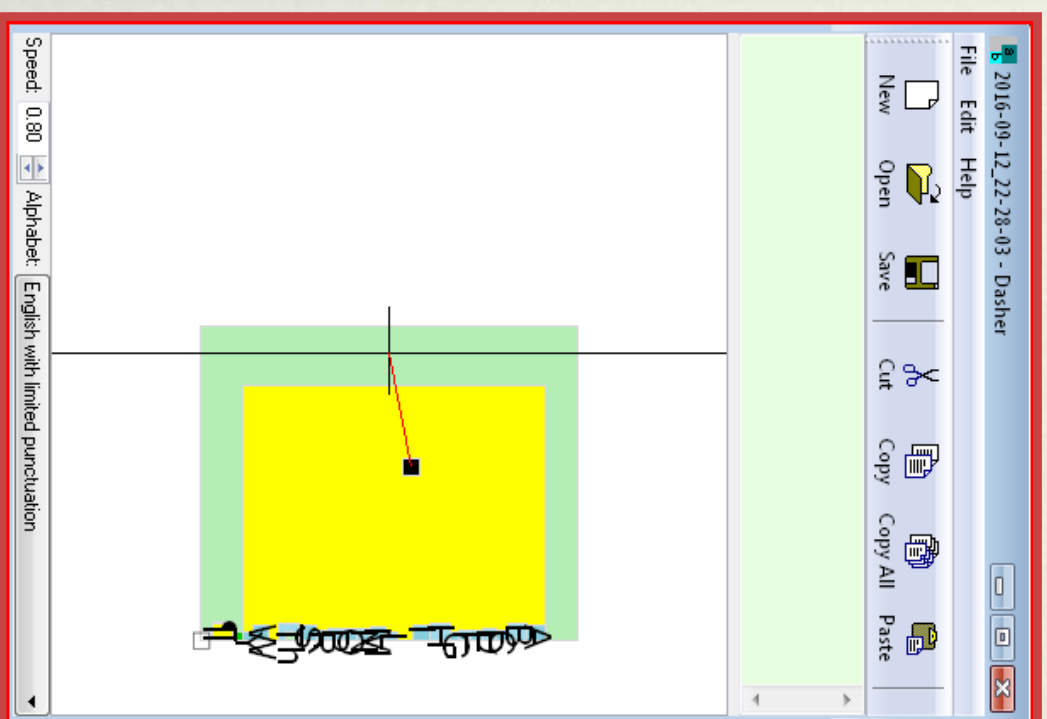


- Features:
- Word prediction
 - Size adjustments
 - Built in dwell option
 - Macro capability



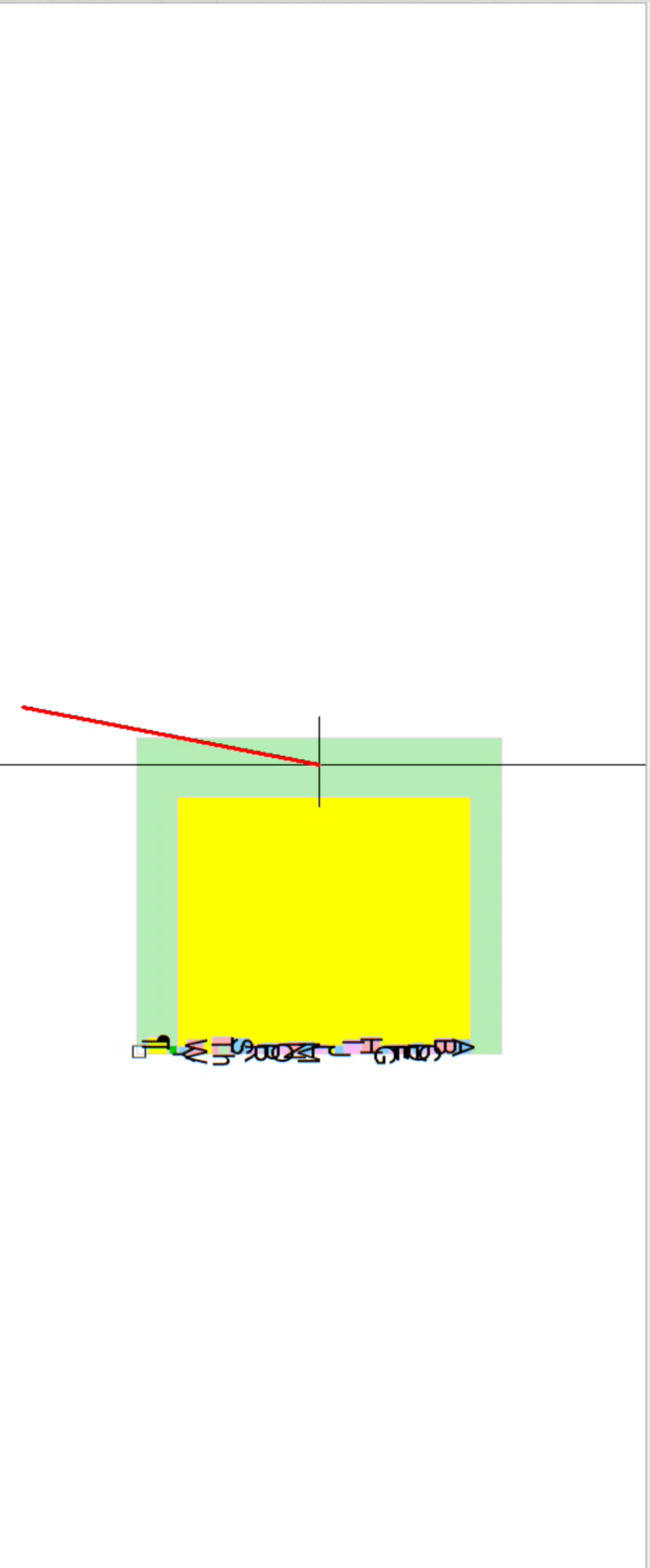
Video game style

- ❖ Dasher
 - ❖ Streaming letters
 - ❖ Attack of the alphabet
 - ❖ Minimal movement
 - ❖ Word and phrase prediction



Dasher

File Edit Help

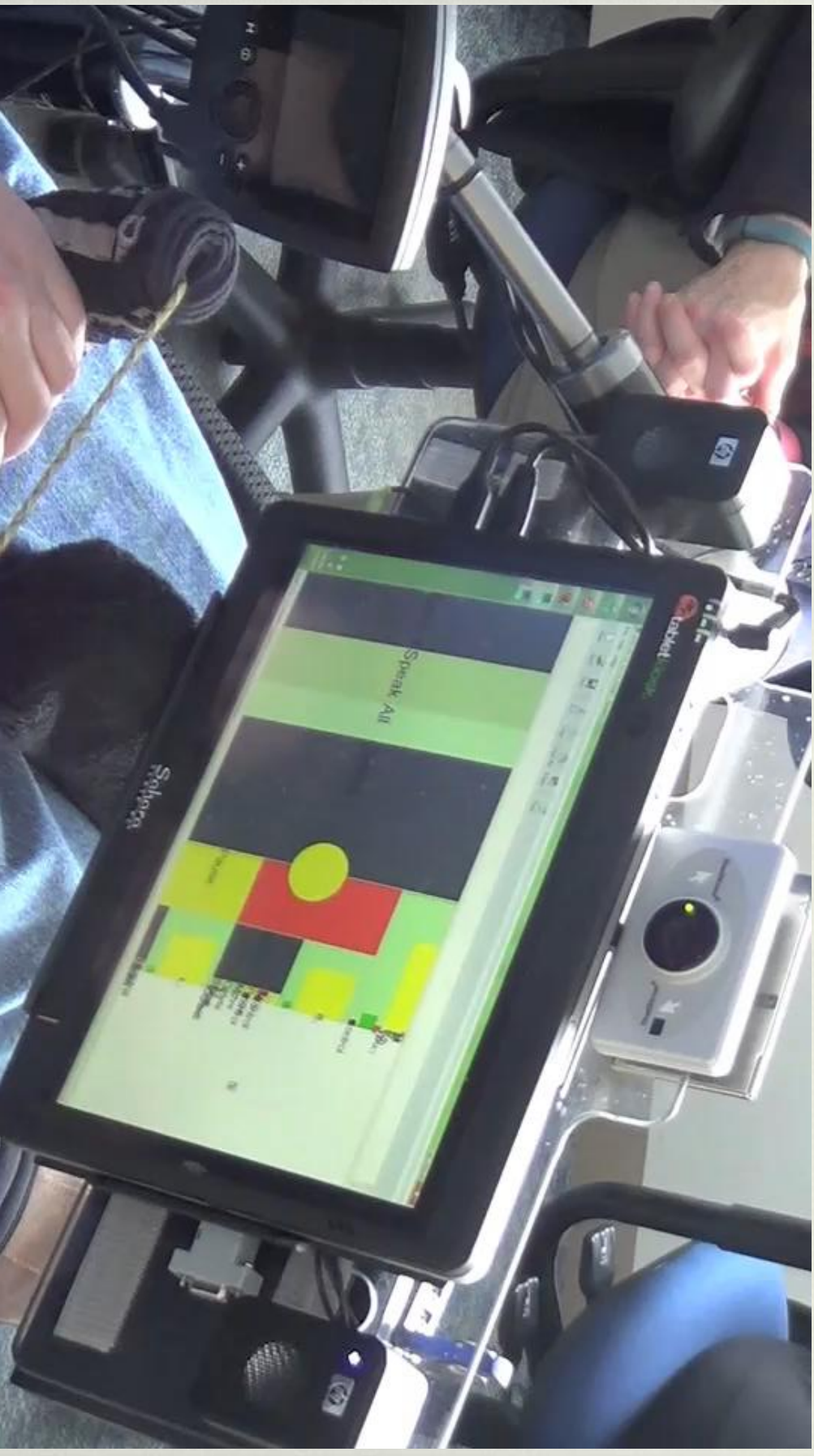


Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Dasher in Action



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Voice input

- ❖ (Hey) Siri
- ❖ OK Google
- ❖ Alexa
- ❖ Not intended as an accommodation for a disability.
Will have difficulty with soft or dysarthric speech.
Limited Functionality
 - ❖ Siri cannot voice answer an incoming call
 - ❖ Hey Siri may require the iPhone to be plugged in/may run down the battery quickly



Voice input - computer

- ❖ Dragon Naturally Speaking
 - ❖ Microsoft/Mac built in voice recognition software
- ❖ Not intended as an accommodation for a disability.
 - Will have difficulty with soft or dysarthric speech.
 - ❖ Best for word processing
 - ❖ Custom commands available (Dragon)
 - ❖ Plan for a learning curve





- ❖ For people with limb onset ALS, voice recognition software allows them to remain connected to friends, family and the world. Voice recognition software may provide the means of remaining employed.
- ❖ Use of voice recognition software requires training and customization.
 - ❖ Learning how to dictate, learning commands
 - ❖ Adding vocabulary
 - ❖ Adding text macros
 - ❖ Adding command macros



“Living with ALS seems a bit like going into the witness protection program. Everything I have ever known about myself, how I look, how I act, how I interact with the world, is rapidly and radically changing. When I could no longer type with my hands, I knew I could give up writing entirely or use voice recognition software. I’m not a young woman. This took real work. Interestingly, I write more now than ever before.”

Catherine Royce



Boston Children's Hospital
Until every child is well



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Voice mouse control

- ❖ Mouse Grid
- ❖ Move mouse up/down/right/left
 - ❖ Faster / Much Faster
 - ❖ Slower / Much Slower
 - ❖ Stop
- ❖ “Mouse click” / “Mouse double click”
- ❖ “Drag mouse up/down/right/left”



Macros

- ❖ “Peggy’s email” = Peggy.Dellea@Childrens.Harvard.edu
- ❖ “Visa Card Number” = 5808 330 2435 3319
- ❖ “Bank sign in page” = <https://www4.citizensbankonline.com/efs/servlet/efs/login.jsp>
- ❖ “Bank password” = Give\$Me\$Money\$



- ❖ “Check my email” =
- ❖ Alt + D
- ❖ `https://login.yahoo.com/config/login?.src=fpctx&.intl=us&.lang=en-US&.done=https%3A%2F%2Fwww.yahoo.com`
- ❖ Enter
- ❖ Wait
- ❖ `JohnSmith@yahoo.com`
- ❖ Enter
- ❖ Wait
- ❖ `MySecretPassword`
- ❖ Enter

The image shows a screenshot of a web browser. The background is an advertisement for Charter Spectrum, featuring a football player in a red jersey and helmet, holding a football. Text on the ad includes "Charter Spectrum", "Catch This Great Offer", "SAVE up to \$233*", "In FAST Internet, the MOST HD TV and the BEST Phone", and "GET IT NOW". Overlaid on the bottom right of the ad is the Yahoo! sign-in interface. It features the "YAHOO!" logo, a "Sign in" button, and a text input field labeled "Enter your email". Below the input field is a blue "Next" button. To the left of the "Next" button is a checkbox labeled "Stay signed in" which is checked. Below the checkbox is the text "To sign in, enter your email and tap 'Next'". To the right of the "Next" button is a link "Need help?". At the bottom left of the sign-in box is a link "Don't have an account? Sign up".



Boston Children's Hospital
Until every child is well™



**HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL**



what is the keyboard shortcut for junk in outlook



Sign in

All News Videos Images Maps More Settings Tools

About 295,000 results (0.72 seconds)

Task shortcuts:

Action	Keyboard Shortcut
Create a new task (when in Tasks).	Ctrl+N
Create a new task (from any Outlook folder).	Ctrl+Shift+K
Create a new task request.	Ctrl+Shift+U
Open selected item.	Ctrl+O
7 more rows	

Keyboard shortcuts for Outlook - Slipstick

www.slipstick.com/outlook/keyboard-shortcuts-outlook/

About this result • Feedback

Process your mail quicker with keyboard shortcuts - MSOutlook.info

<https://www.msoutlook.info/question/617>

CTRL, ALT and/or SHIFT are involved with most keyboard shortcuts. Below is an overview of my most commonly used keyboard shortcuts in Outlook to process my incoming emails. ... Mark a junked message as Not Junk, CTRL+ALT+J ...

Signing into Yahoo – several steps



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Command Macro Examples

- ❖ “Facebook” =
Alt + D
www.facebook.com
Enter
- ❖ “Email sign in” =
johnsmith@aol.com
Tab
my&%secret967password
Enter



Boston Children's Hospital
Until every child is well™

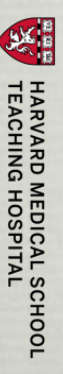


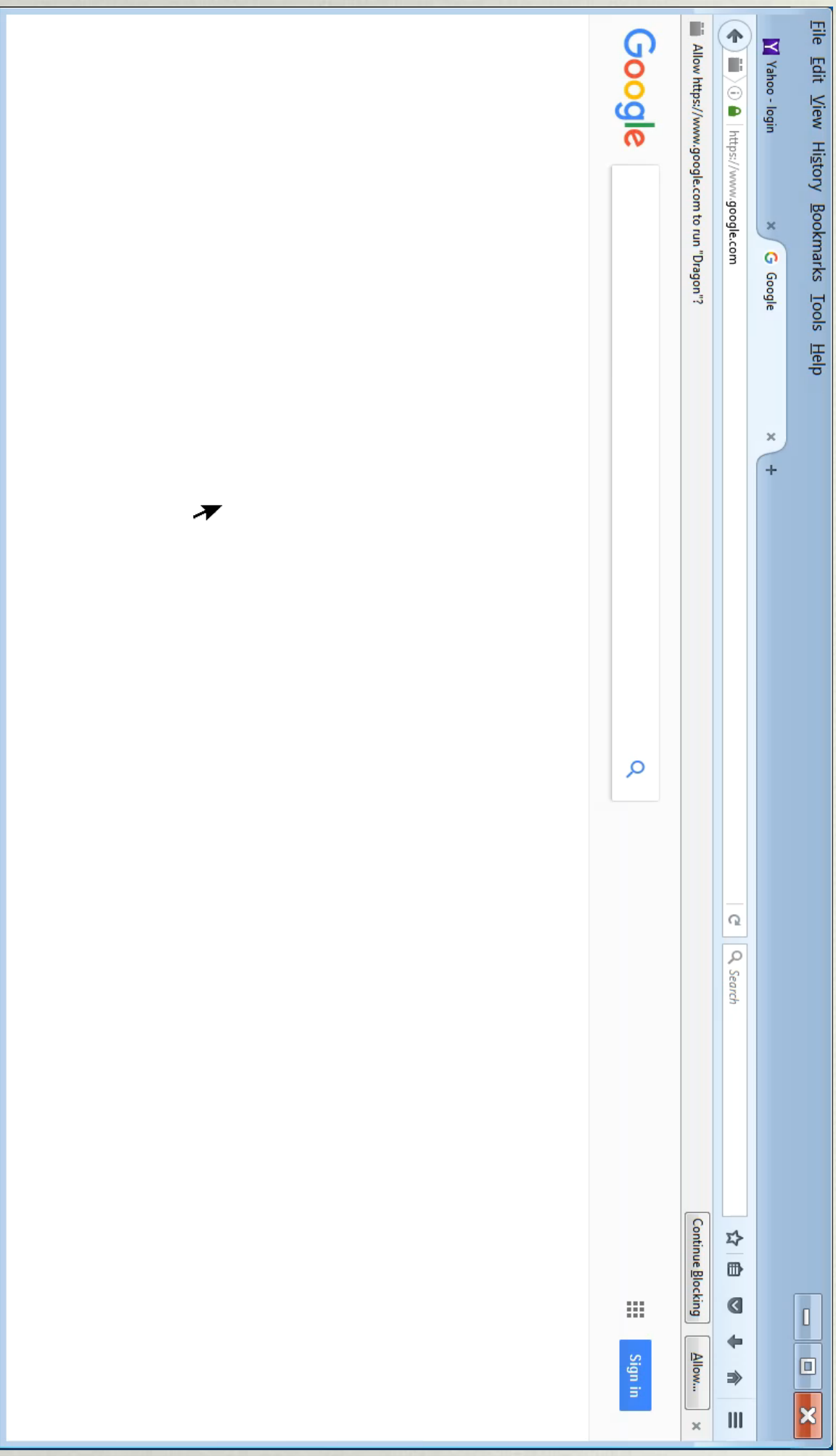
- ❖ “Check my email” =
- ❖ Keystroke: Alt + D
- ❖ Typing: `https://login.yahoo.com/config/login?.src=fpctx&intl=us&.lang=en-US&.done=https%3A%2F%2Fwww.yahoo.com`
- ❖ Keystroke: Enter
- ❖ Wait
- ❖ Typing: `JohnSmith@yahoo.com`
- ❖ Keystroke: Enter
- ❖ Wait
- ❖ Typing: `MySecretPassword`
- ❖ Keystroke: Enter

The image shows a composite of two screenshots. The top screenshot is an advertisement for Charter Spectrum, featuring a football player in a red jersey and helmet. The ad text includes: "Charter Spectrum", "Catch This Great Offer", "SAVE up to \$233¹ on FAST Internet, the MOST HD TV and the BEST Phone", and "GET IT NOW". The bottom screenshot is a Yahoo! sign-in form with the following elements: "YAHOO!", "Sign in", "Enter your email", a blue "Next" button, "Need help?", "Stay signed in" (checked), "To sign in, enter your email and tap 'Next'", and "Don't have an account? Sign up".



Boston Children's Hospital
Until every child is well™





Check my email one step

*Yes - this can be done with individual voice commands/typing.
But Catherine Royce once told me to “Choose easy”.*



Boston Children's Hospital
Until every child is well™

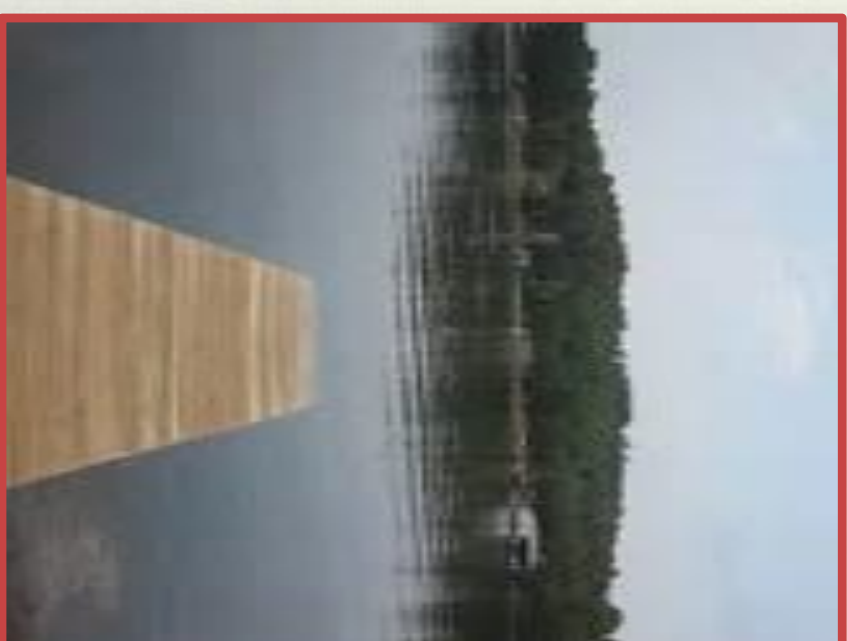


Until every child **Bobby Dellea** January 2017



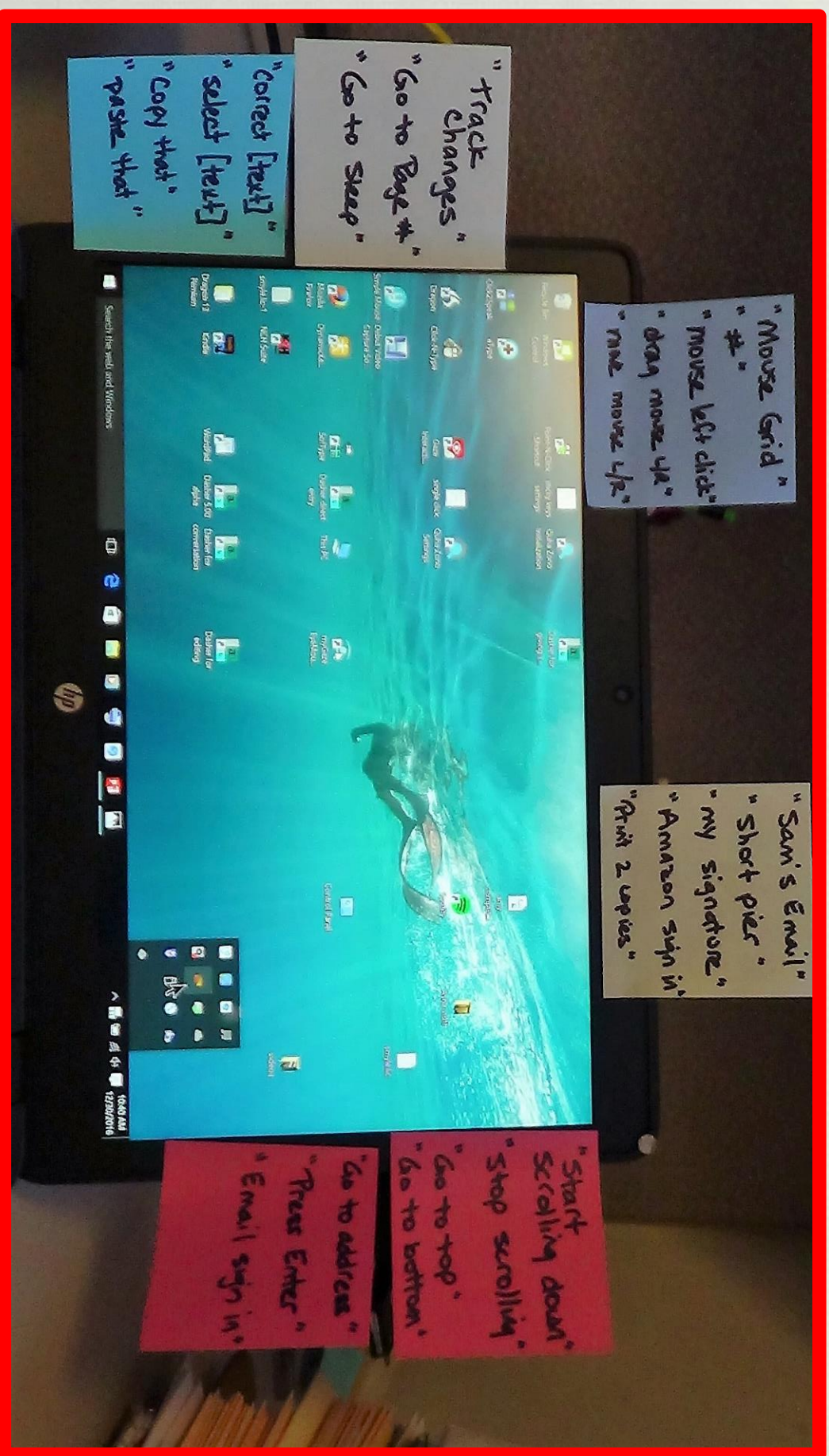
HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

- ❖ “Short Pier” =
 - ❖ Ctrl + A
 - ❖ Alt + O
 - ❖ F
 - ❖ Times New Roman
 - ❖ Tab
 - ❖ 8
 - ❖ Enter
 - ❖ Control + Enter





A little cognitive assist



Eye Gaze Interface – The eyes have it



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Eye Gaze

- ❖ Infrared Camera
- ❖ Position Position
Position
- ❖ Enlarged Targets
- ❖ Blink, Dwell, or
Switch clicking



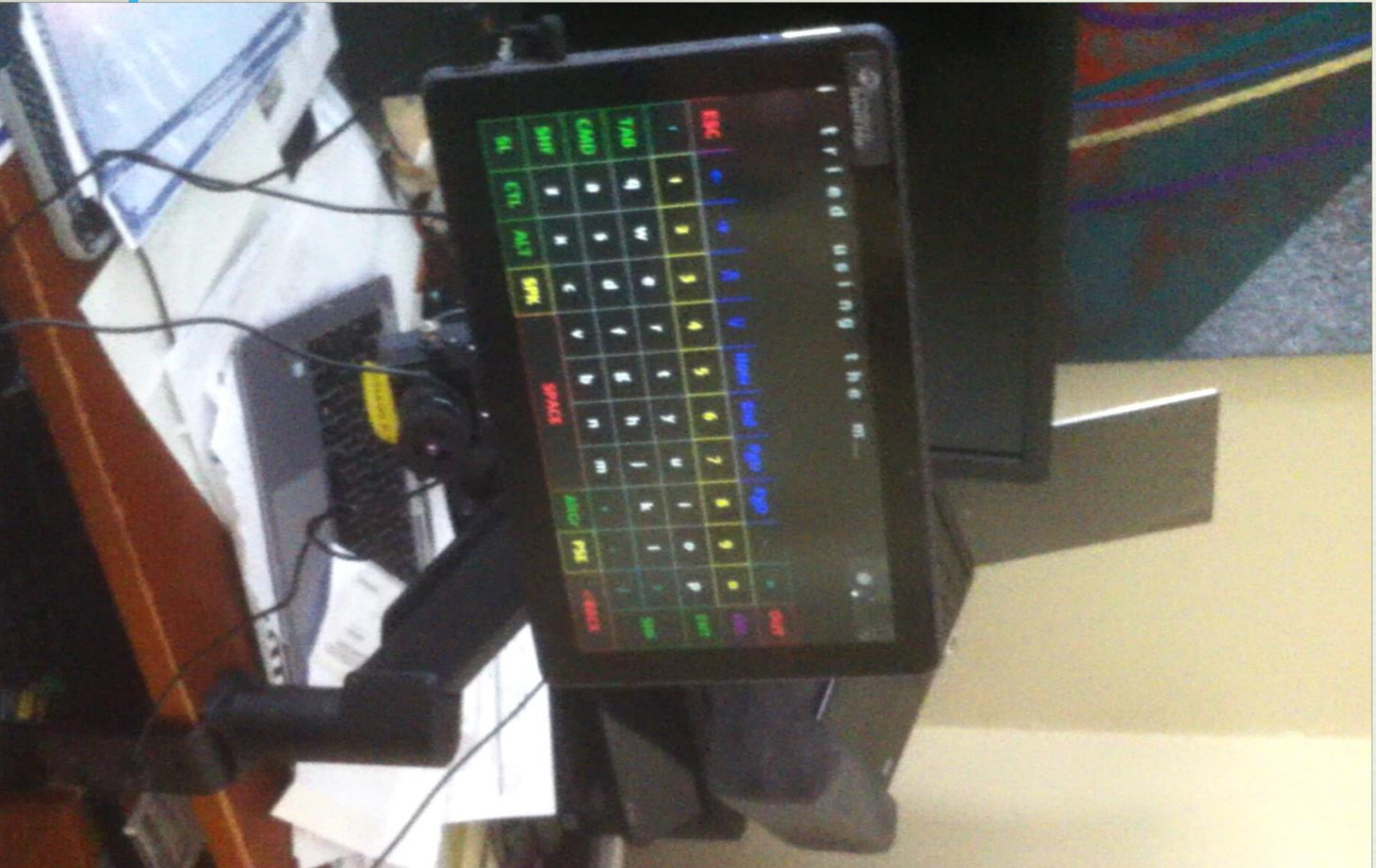
Eye Trackings in Action dwell selection



Boston Children's Hospital
Until every child is well™



Boston Children's
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Eye tracking -switch click selection



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Problems

- ❖ Ptoxis - camera needs to view the full pupil
- ❖ Pupils dilated or constricted
- ❖ Cataracts
- ❖ Nystagmus
- ❖ Dry Eyes
- ❖ Attentional deficits
- ❖ Head Movement
- ❖ (Re) Positioning (position, position, position)
- ❖ Glasses and Contacts



Eye Gaze for Computer Interface

- ❖ Eye camera “bar” connects via USB
- ❖ Moves cursor across the screen
- ❖ Requires use of “gaze interaction” software



Wheelchair Mounts



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Floor Mounts



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Phone mounts



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

“Reading is
huge.”



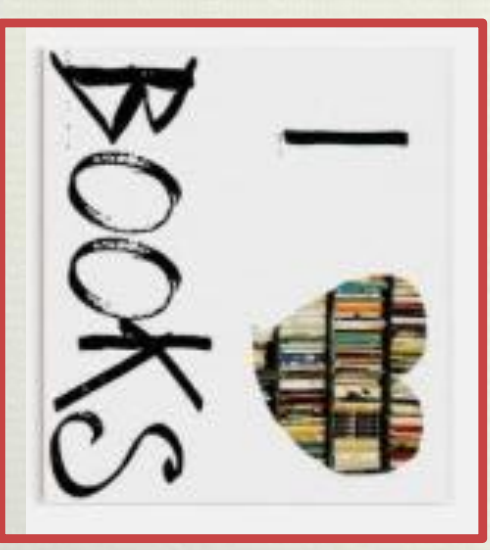
Boston Children's Hospital
Until every child is well



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Access to books (hardcopy or digital)

- ❖ Audio books
- ❖ Hardcopy books / book holders
- ❖ Kindle/iBooks



Boston Children's Hospital
Until every child is well™

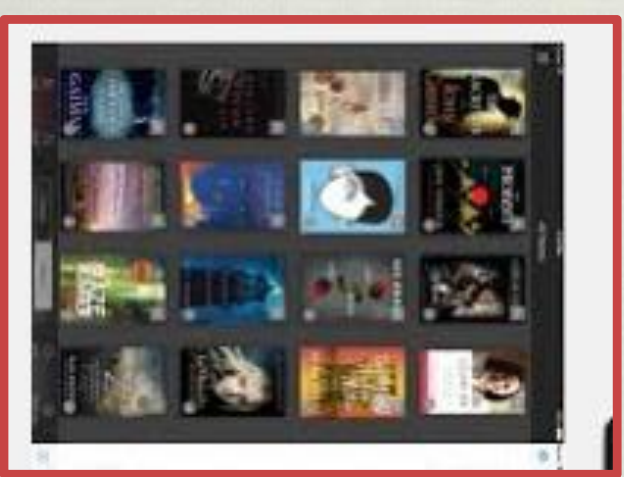


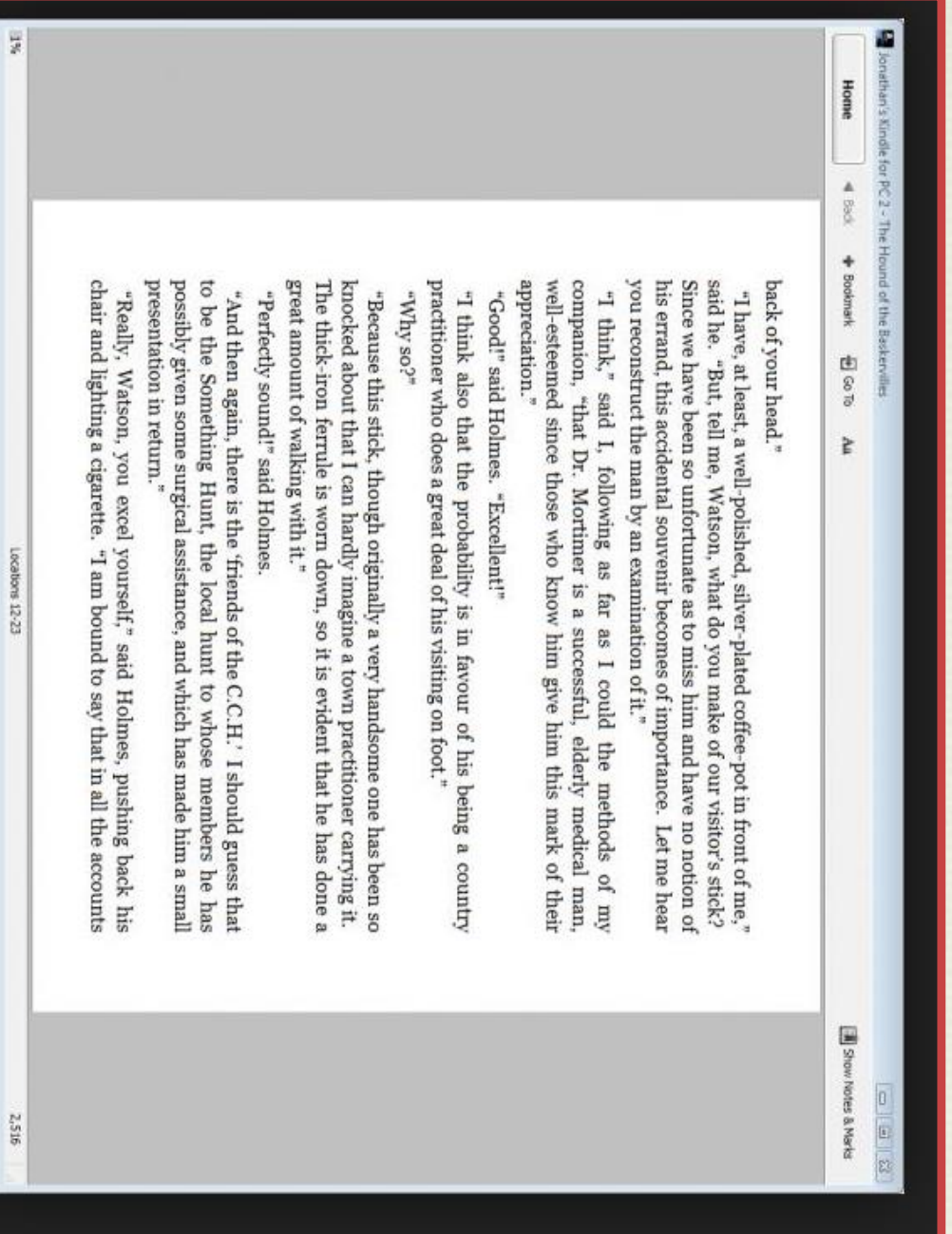
HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Kindle for the computer



- ❖ Free download (*Amazon.com*)
- ❖ Available for PC or Mac
- ❖ Out of copyright material is free
 - ❖ (free is good!)
- ❖ Simple program
 - ❖ Easy to adapt





Click to turn page:

- Mouse
- HeadMouse
- Switch-adapted mouse
- Dwell software
- Eye Gaze interface
- Switch programmed to the right arrow key
- "Press right arrow" command
- Custom voice command (e.g. "turn page")



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

“The best thing
about that session
was seeing his face
when he was using
the Kindle software.”



Boston Children's Hospital
Until every child is well



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

“Shouldn’t he be doing this without the switch? He won’t be able to use the switch when the disease progresses.”



Boston Children's Hospital
Until every child is well



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Speech Generating Device Access

(they are often computers, after all)

- ❖ Touch screen
- ❖ Stylus and stylus holders
- ❖ Keyboard
- ❖ Mouse
- ❖ Trackball
- ❖ Head tracking
- ❖ Adapted mouse
- ❖ Switch scanning
- ❖ Eyetracking access



Access to iPad/ Android tablets

- ❖ Position of device
- ❖ Use of finger and/ or stylus
- ❖ Voice typing
- ❖ Adaptive access
- ❖ Siri
- ❖ Mounting options



Phone Access

- ❖ Landline options – large buttons, speaker phone
- ❖ Speaker phone options
- ❖ Smartphone use
- ❖ Hands-free cell phone use
- ❖ Switch scanning on iPhone
- ❖ Siri / OK Google / Alexa
- ❖ Mounting options



Call system / attention signal

- ❖ Commercial wireless doorbell
- ❖ Switch-adapted attendant alarm
- ❖ Baby monitor



- ❖ Portable speech output device with or without switch



Brain Computer Interface (BCI)

Trying to make its way to the end user
yes it is a real thing
no, it cannot read your mind

“Reads” output of brain cells, interprets the signal

Implanted vs. surface electrodes

P300 (“aha” response)





pong



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Tele-treatment



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Feb 16, 2016

Dear John,

Thank you for our meeting last Tues. As we move forward slowly, I appreciate your intent to truly understand Eric and his desires. As you have surmised he is slowly processing what he wants, and "forcing" decisions does not work. I also greatly appreciate your passion and resulting offer to always be available, even to doing home visits. I later realized what relief I felt, knowing we would not somehow be abandoned because we could not resolve the next step in a timely manner. Truly...I was relieved of an anxiety I had not realized I had.

Amelia



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Short Pier

- ❖ Keystroke: Ctrl + A
- ❖ Keystroke: Alt + O
- ❖ Keystroke: ff
- ❖ Type “Times New Roman”
- ❖ Keystroke: Tab
- ❖ Type “g”
- ❖ Keystroke: Enter
- ❖ Keystroke: Alt + S



Boston Children's Hospital
Until every child is well™



A recent email

Dear Peggy:

I am able to use the single command for downloading
CaringBridge. Saved me so much agita!!!

Michelle



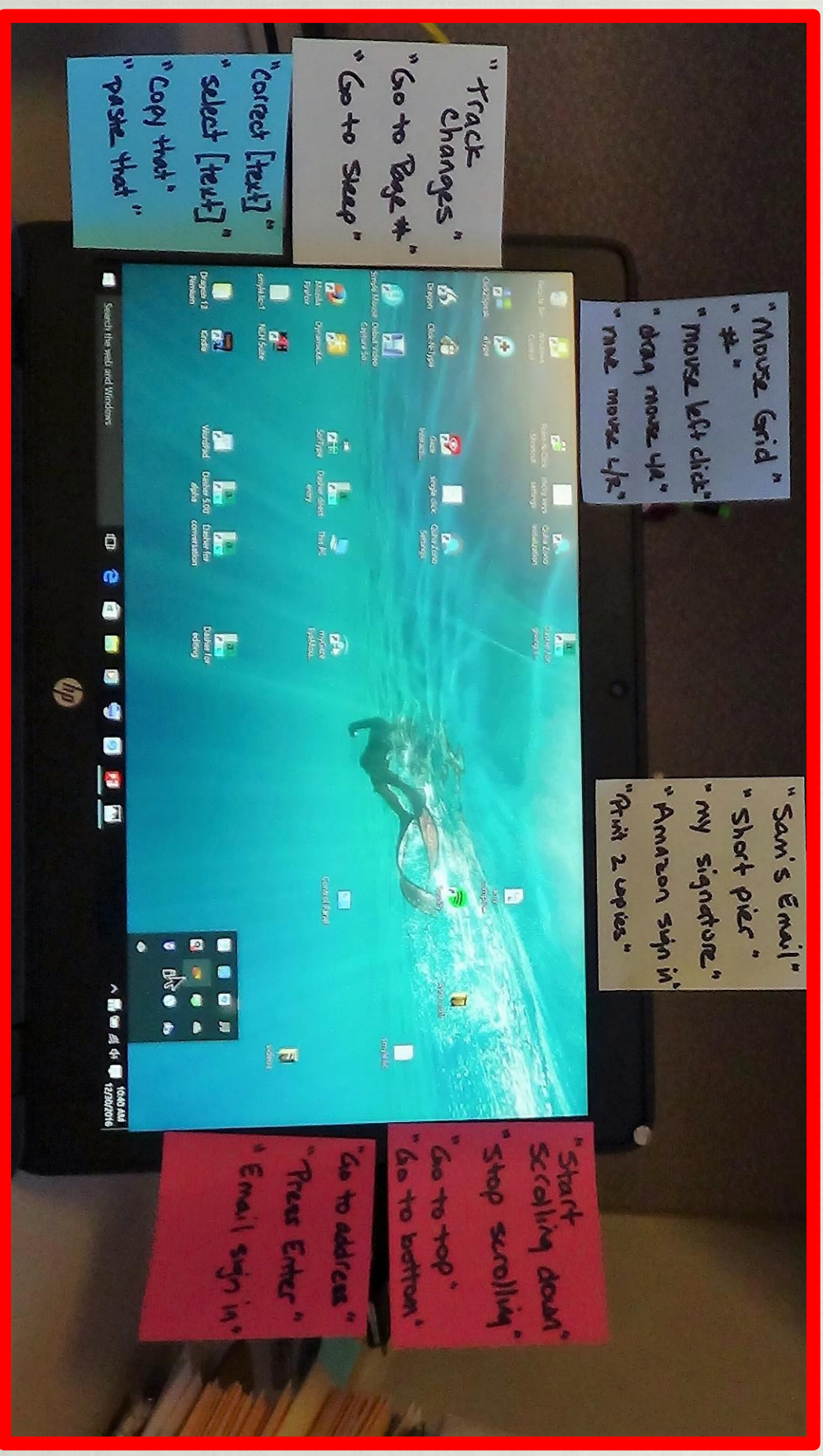
Boston Children's Hospital
Until every child is well™

Peggy Della January 2017



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

A little cognitive assist





what is the keyboard shortcut for junk in outlook



All News Videos Images Maps More Settings Tools

About 295,000 results (0.72 seconds)

Task shortcuts:

Action	Keyboard Shortcut
Create a new task (when in Tasks).	Ctrl+N
Create a new task (from any Outlook folder).	Ctrl+Shift+K
Create a new task request.	Ctrl+Shift+U
Open selected item.	Ctrl+O
7 more rows	

Keyboard shortcuts for Outlook - Slipstick

www.slipstick.com/outlook/keyboard-shortcuts-outlook/

About this result • Feedback

Process your mail quicker with keyboard shortcuts - MSOutlook.info

<https://www.msoutlook.info/question/617>

CTRL, ALT and/or SHIFT are involved with most keyboard shortcuts. Below is an overview of my most commonly used keyboard shortcuts in Outlook to process my incoming emails. ... Mark a junked message as Not Junk, CTRL+ALT+J ...

Signing into Yahoo – several steps



Boston Children's Hospital

Intil every child is well™
Peggy O'Lea January 2017



**HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL**

Checking email with text macros and built in commands

- ❖ “go to address bar”
- ❖ “yahoo sign in page” – types URL
- ❖ “press enter” – goes to that page
- ❖ “yahoo user name” – types email address
- ❖ “press enter” – brings up password page
- ❖ “yahoo password” – types password
- ❖ “press enter” – signs you in

Command Macros

- ❖ Input keystrokes, not just text
- ❖ String together several steps
- ❖ Record mouse movements and keystrokes
- ❖ Open programs/files



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Command Macro Examples

- ❖ “Facebook” =
Alt + D
www.facebook.com
Enter
- ❖ “Email sign in” =
johnsmith@aol.com
Tab
my&%secret967password
Enter




Boston Children's Hospital
Until every child is well™



- ❖ “Check my email” =
- ❖ Keystroke: Alt + D
- ❖ Typing:
 - https://login.yahoo.com/config/login?.src=fpctx&intl=us&lang=en-US&.done=https%3A%2F%2Fwww.yahoo.com
- ❖ Keystroke: Enter
- ❖ Wait
- ❖ Typing: JohnSmith@yahoo.com
- ❖ Keystroke: Enter
- ❖ Wait
- ❖ Typing: MySecretPassword
- ❖ Keystroke: Enter




Boston Children's Hospital
Until every child is well™



Catch This Great Offer

SAVE up to **\$233!**
In FAST Internet, the MOST HD TV
and the BEST Phone



AdChoices

[GET IT NOW](#)

YAHOO!

Sign in

Enter your email

[Next](#)

Stay signed in

To sign in, enter your email and tap "Next"

[Need help?](#)

Don't have an account? [Sign up](#)

*Yes - this can be done with individual voice commands/typing.
But Catherine Royce once told me to “Choose easy”.*



Boston Children's Hospital
Until every child is well™



Until every child Betsy Dellea January 2017



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL