Spirit of Curiosity

"THE ONLY DIFFERENCE BETWEEN 'I'M TECHIE' AND 'I'M NOT TECHIE' IS THE WILLINGNESS TO CLICK ON STUFF AND SEE WHAT HAPPENS."

Alice Keeler @alicekeeler

QuotED

Out-smarting Smart Technology

Date: November 14, 2018
Presented by: HSC Assistive Technology Program

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- Zoya Khan, OT
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Objectives

- Identify current issues with available technology – gaps in the system.
- Provide basic understanding of commercially-available/mainstream technology options.
- Reach out/collaborate with the community to come up with solutions for users who need this technology.

Agenda

The Basics of Assistive Technology
Overview of Switches and Other Access Methods - pros/cons
General setup and principles of EADLs
Case Scenarios and Specific Population Needs

Switches and Bluetooth Pairing
Hands-on Bluetooth Pairing
Types of Scanning: item-mode vs. point-mode

Voice Activated Devices

AT Process
General Assessment, Trial and Recommendation Process
Troubleshooting Tips

Conclusion/Questions

What is an EADL?

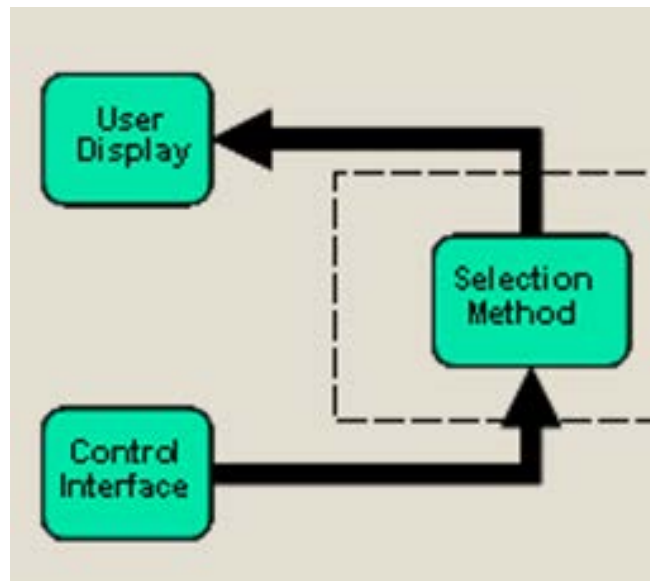Electronic Aids to Daily Living

What is an EADL?

An interface/ system/ controller unit to help an individual with limited physical abilities to control electrical devices or appliances in his/her environment from a central location.

Example of electrical devices: lights, televisions (TV), call systems, telephones, etc.

Main Components

From Donna Collins, 2015
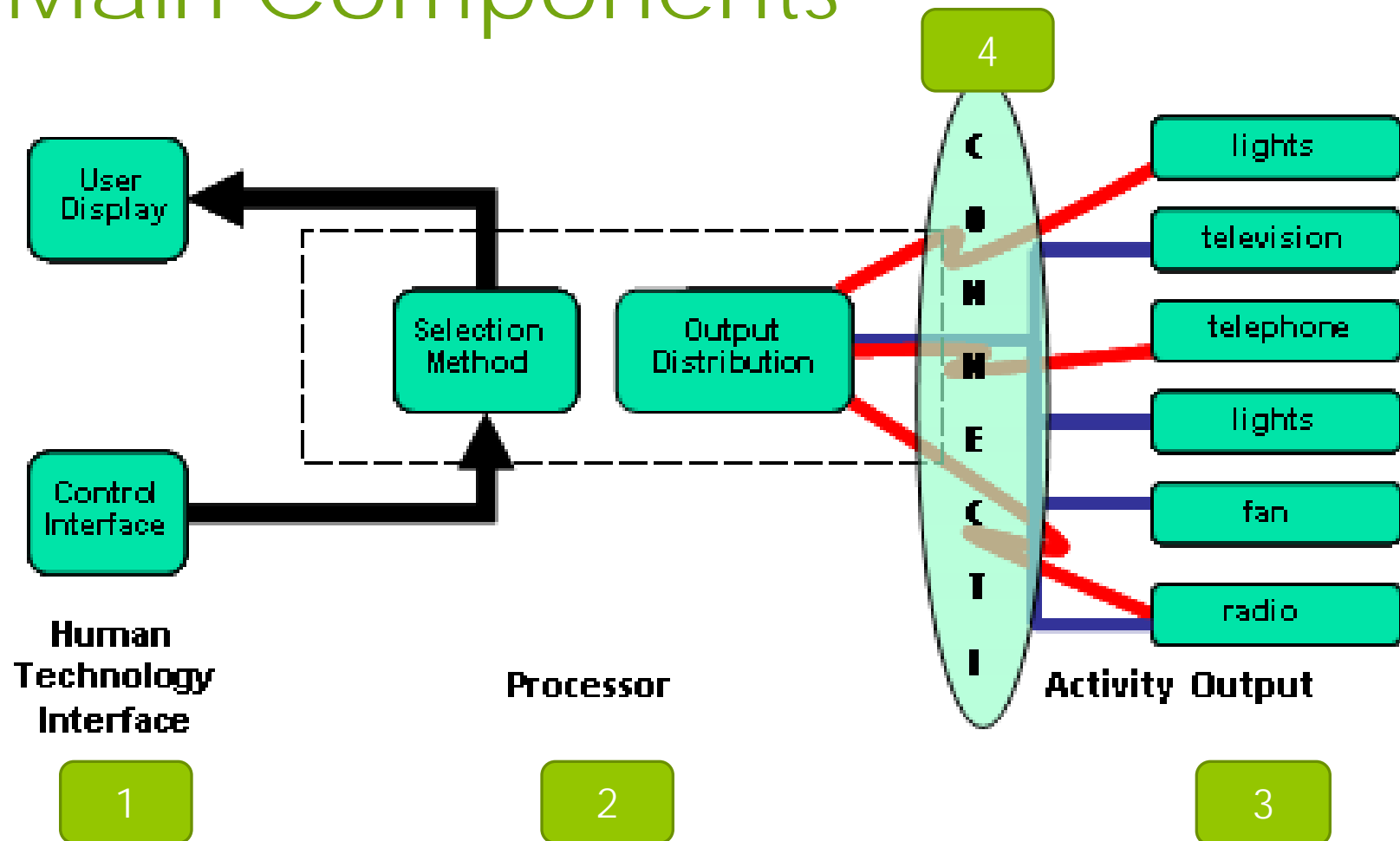
Human Technology Interface

User Display

- What does the user see?
- What does the user hear?
  - Assessment of visual, auditory and cognitive abilities to ensure user has the appropriate response to device.
  - Consider language/cultural barriers.
  - Many devices can be customized to the user which may improve the user's comfort level and success with new devices.

User Interface

- What position will the user be in typically and can it be accessed well?

  - Assessment of the home environment and user's daily routines (i.e. when user is in bed or wheelchair)

  - Importance of good seating/stable positioning (i.e. may require custom or addition of secondary supports)

  - Assessment of mounting hardware and other wheelchair accessories to ensure good access to device.

Selection Method

- How does the user activate the device?
  - Physical status – ROM, strength, endurance/energy level
  - Cognitive status – memory, learning and processing styles
  - Emotional status – frustration tolerance and motivation levels

- What method works best for the user?
  - Direct Selection - easiest!
  - Modified Direct Selection – use of stylus, or pointers to control device, voice control
  - Indirect Selection – switch with scanning

Controller Unit/ Processer

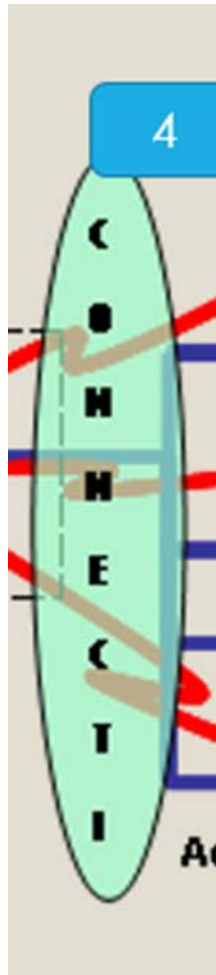| Simple Devices	Complex Devices
Control one or 2 appliances. Typically, provides control in one room.	Controls multiple appliances/potential to pair with different devices/multiple rooms.
Typically "on/off" function only.	Customizable settings which requires programming/setup.
Not very customizable for the user.	Multiple functions or control (i.e. Macros).
Least costly.	Regular charging/ maintenance to operate.

Examples

Activity Output

- What <u>appliances/</u>activities does the user need to control for basic safety/access to optimize independence?
  - Call system for safety;
  - Entering/exiting a home;
  - Daily tasks that are meaningful to the user (self-efficacy, quality of life, and fulfillment of roles).

- Important <u>environmental factors</u> to consider:
  - **Physical** - home, school, work or multiple places; physical space; power outlets; location of target devices; placement and access to device
  - **Social** – supports in place to setup/troubleshoot, repair/maintain device
  - **Economic** – cost of equipment and available funding; navigation of funding process.

Connections

Connections

The "language" of transmission from the controller unit (EADL) to "activity output".

Hard Wired (power cable – AC power)

- **Uses existing house** wiring for signal transmission.
- Pros: least costly, simple devices, learning tool
- Cons: not mobile, limited to one-room application only
- Example: Insteon modules, WeMo, PowerLink4

Remote (wireless)

- **Ultra sound -** e.g. TASH Ultra 4 (rarely used)

- **Voice -** e.g. Voice IR, SiCare, Roomate Plus, Quartet

- **Infrared (IR) –** requires direct line-of-sight

  e.g. TV remote, Relax II, iPad, SAJE PocketMate or Roomate Plus, GEWA Prog, Possum Primo, ENSOM III

- **Radio Frequency (RF) -** Requires receiver & transmitter or pairing of devices

  e.g. garage door opener – 25′ range; WiFi – 100′ range; Bluetooth – 25-30′ range

  - can get boosters to increase range

Sensor Technology

- **Passive Motion Sensors (PIR) -** usually detects body heat

- **Active Motion Sensors –** commonly uses microwaves or infrared to detect motion

- **Dual Action Sensors –** combination of different active motion sensors to reduce false triggers (e.g. bank security systems**)**
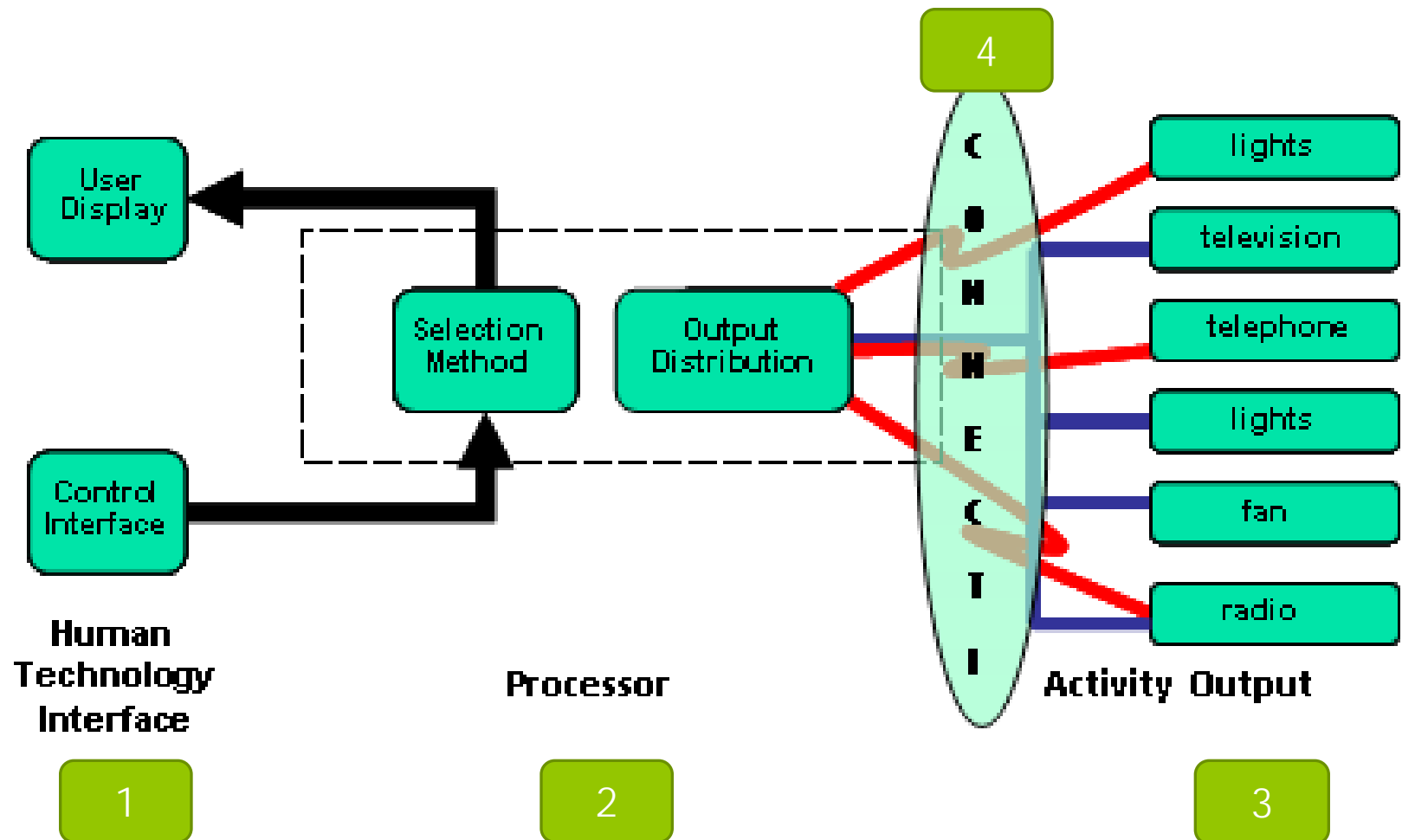
https://www.efxkits.co.uk/motion-sensors-detectors-with-applications/#respond

http://www.safewise.com/resources/motion-sensor-guide

Current State of EADLs

- History of Ensom & Ziskas
- New options emerging
- Funding Status
- Exciting Research Opportunities!

Case studies

From Donna Collins, 2015

Case Studies

- Client 1:
  - Male in his mid 30's
  - C5 Level spinal cord injury (incomplete), with reduced upper extremity function
  - Inpatient in Rehab, feeling isolated from his young family
  - Recently purchased a new smart phone
  - Currently trialing power wheelchairs, not yet reached a final prescription
  - Goal is to be able to communicate with his family and friends through calls, messages and social media while in hospital as well as access entertainment while resting in bed
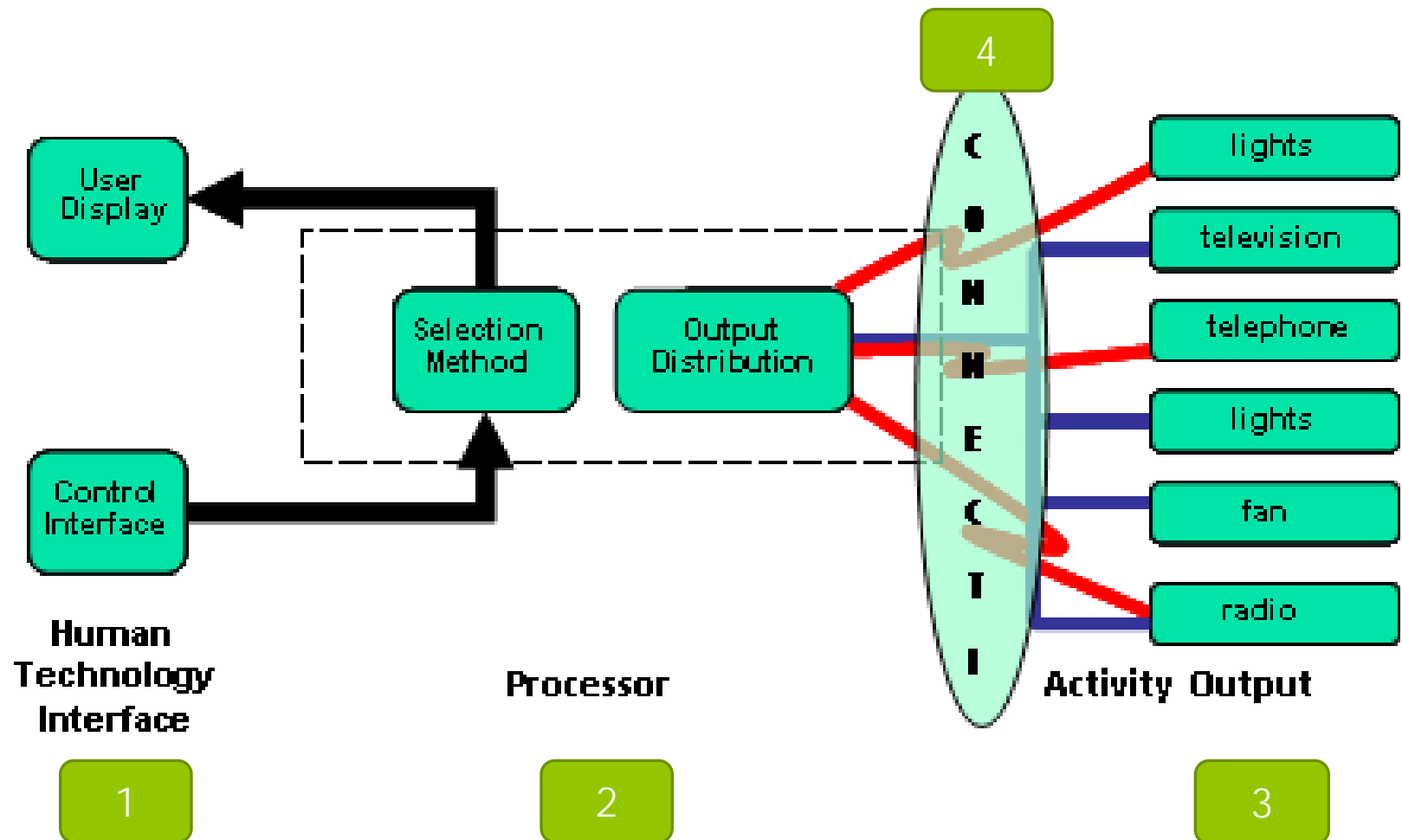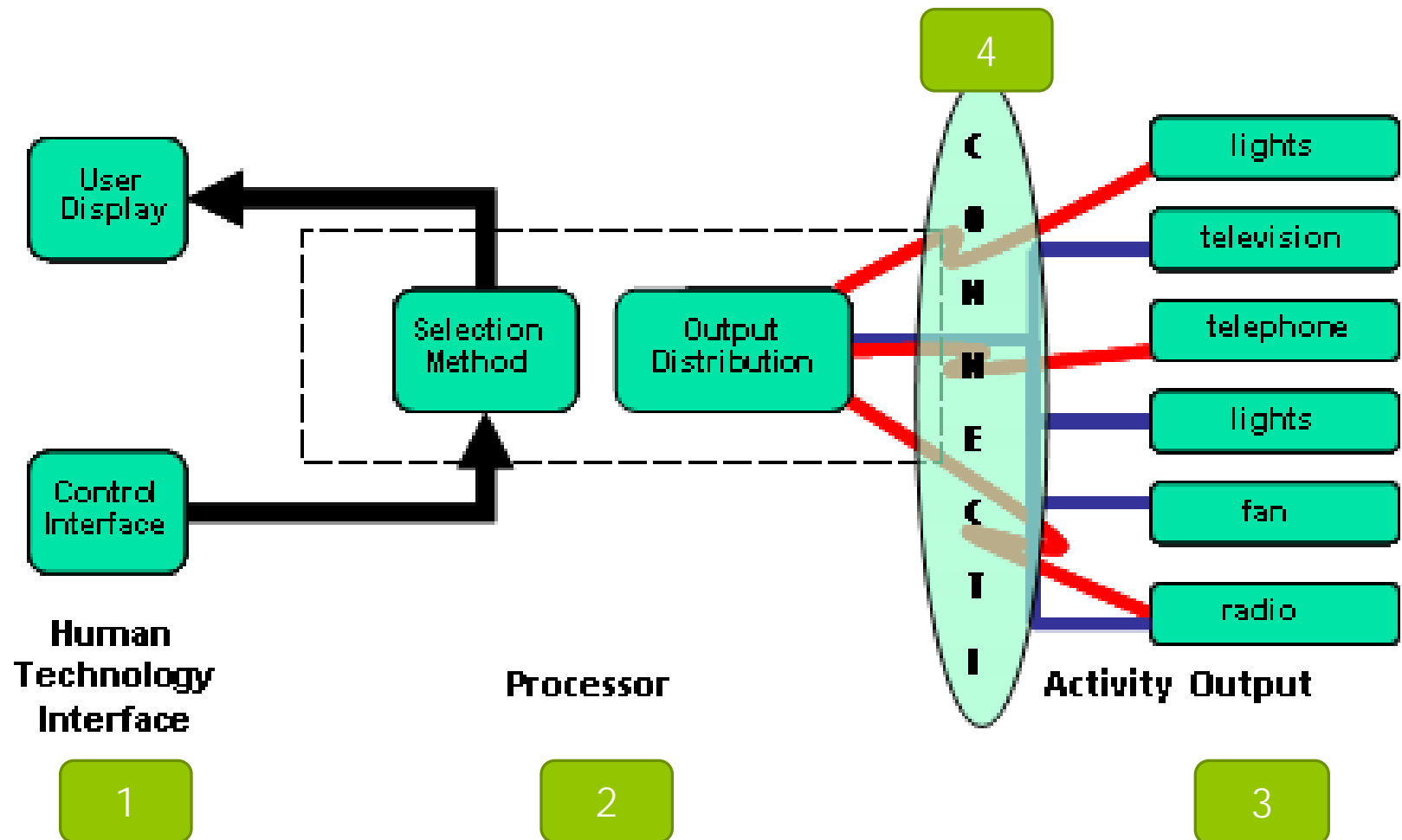
From Donna Collins, 2015

Client 1

Human/ Tech Interface	Selection Method	Control/ Connection	Activity Output
No Cognitive or visual issues, decreased hand function	**Modified direct selection**	**Has access to WiFi and Bluetooth using his smartphone**	**Calls and messaging**
Has a smartphone	Indirect selection		Social Media
Basic understanding of technology			Entertainment (videos, music)
Needs access from bed and wheelchair			

Case Studies

- Client 2:
  - C4 Level Spinal Cord Injury with a spinal fusion
  - No active use of upper extremities
  - Enjoyed video gaming prior to injury
  - Drives a Permobil Power wheelchair using sip/puff controls
  - Owns his own Android smartphone
  - Wants to be able to access social media, calls and messaging, watch movies and play video games

From Donna Collins, 2015

Client 2

Human/ Tech Interface	Selection Method	Control/ Connection	Activity Output
No cognitive issues, decreased visual field	**Indirect selection**	**WiFi and Bluetooth access from smartphone**	**Calls and messaging**
Has a smartphone and a smart television	Uses sip/puff system on his power wheelchair	Bluetooth access from Power wheelchair	Video gaming
No upper extremity function			Videos/movies on television
Good understanding of technology/ android system			

Break

Switch Access

Switches provide **access** to a device to control on/off or selection of features.

Types of devices: tablets/computers, speech generating devices, call bells, powerchair functions, etc.

Interface: various styles - USB/wired and Bluetooth options.
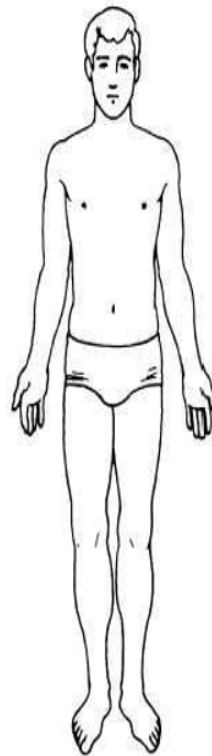
Types of Switches

Mechanical Switches

Electronic Switches

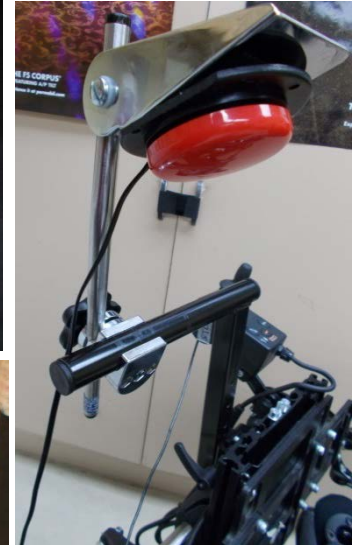# Assessment and Positioning

Hierarchy of switch sites:

- Hands
- Head/voice
- Arms/elbow
- Legs/knees
- Feet
- Mouth
- Mind

The **ideal** switch site uses:
- The least amount of energy/ strength/ ROM as possible
- Reliable Method
- Consistent Activation
- Controlled Release and Timing

Switch Mounting

Switches & Bluetooth Pairing
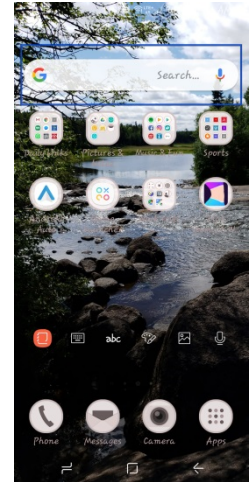
Smart Devices – Basic Access

Direct Selection

- Replace finger function with a stylus.

- Eliminate need for bilateral hand function – use stands and mounting hardware.

Smart Devices – Basic Access

Indirect selection:

- Use built-in accessibility features: switch control and scanning
- Video: iOS 7 switch scan https://www.youtube.com/watch?v=Mu6eDRazXzs

Switch Interface

- TECLA-E (new version) - $399.00 +

- Blue2 Switch - $380.00+

- Hook+ (made by Apple) $240.00+

- Tapio Switch - $99.00+

Switch Functions

Momentary: activates as long as you press the switch; the device does not activate when the switch is released.

Latched: with one press, the device activates until you press the switch again (on powerchair functions, can be called "cruise").

Timed-Latch: with one press of the switch, the device activates for a set time (i.e. 10 seconds).

Scanning Functions

Patterns: item/single, row/column, pointer, group, custom

Selection: Automatic, step, inverse

Feedback: auditory, visual

Hands-on:

- General Settings on your i-Device:
  - Triple-Click Home shortcut
  - Go to "Switch Control"
  - Assign Switches
  - Setup scanning speeds
  - Try "Item Mode" and "Point Mode"
  - Use switch scanning to take a group selfie!

"Convenience for you, Is Independence for Me"

Todd Stabelfeldt, C4 Consulting

Speaking at Apple's Worldwide Developer's Conference

Voice Activated Devices

- Google Home - https://store.google.com/product/google_home

  https://www.youtube.com/watch?v=8aCfB9IYk-o

- Amazon Devices - https://www.cnet.com/news/amazon-echo-device-alexa-connect-september-2017/

- Apple Home Kit – https://www.apple.com/ca/shop/accessories/all-accessories/homekit

Other Modules

Next Steps

Recommended AT Process

HSC AT Program

- Referring Criteria
- Demos and Trial of Devices
- Contact Information
  - Intake:
    - 204-787-2370
  - Fax:
    - 204-787-5099

My needs aren't "special". How my needs are met may be different but they are the same needs as anyone else's.

facebook.com/autismwomensnetwork

WEB RESOURCES

- Ablenet Inc.: https://www.ablenetinc.com/
- Assistive Tech Network: http://atwiki.assistivetech.net/index.php/Electronic_Aids_to_Daily_Living_(EADLs)
- Bridges Canada Inc. https://www.bridges-canada.com/
- Broadened Horizons: http://www.broadenedhorizons.com/
- Ergo Canada website: http://ergocanada.com/ec_home/products/assistive_1.html
- HANA by Norima Innovations.: http://www.norimainnovations.com/hana2
- Origin Instruments: http://www.orin.com/access/orby/
- RJ Cooper: https://store.rjcooper.com/collections/access
- Special Needs Computer: https://www.specialneedscomputers.ca/index.php?pg=1&l=product_list&c=256

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