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ELECTRONIC AIDS TO DAILY LIVING

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Access to Independence

What we are covering

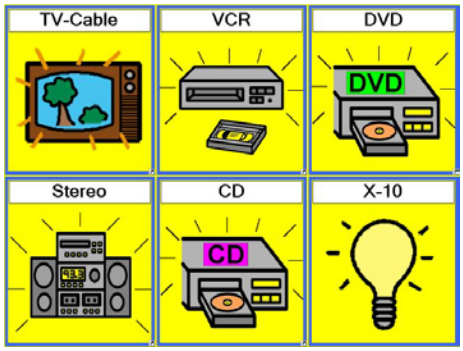
- Electronic Aids to Daily Living
  - Basic EADLs
  - Multifunction EADLs
    - Direct
    - Switch
    - Voice

Learning Objectives

1. The participant will be able to list 2 ways that EADLs increase client safety in the home.
2. The participant will be able to list available methods to access EADLs.
3. The participant will be able to 3 devices that can be controlled through an EADL.

Definition

- EADLs provide independent control of electrical devices within the environment
- EADL Definition: “Any electronic technology used for the specific purpose of providing independent operation of appliances”
  - Barker, Lange 2003



What's in a name

- EADLs
- Formerly Environment Control Units (ECUs) or Environmental Control System (ECSs)
- EADLs defines the task rather than what is being controlled
- ECU technically refers to HVAC

Terminology

Electronic Aids to Daily Living

- EADLs provide alternative control of devices in the environment:
  - Audiovisual equipment
  - Electric hospital bed
  - Door openers
  - Telephone
  - Lights
  - Appliances: fan
  - Heating and air conditioning




Classification

- General Function EADL
  - Limited Output or Basic
  - Multiple Output
- Specific Function EADL
  - door openers
  - stand-alone adapted telephones
  - page turners

Multiple Output EADLs

- Provide control of a variety of devices and functions
- Typically use infrared and X10 technologies
- Access:
  - direct, switch or voice
- Usually too complex for young children or persons with cognitive impairment

Basic EADLs

- Basic Electronic Aids to Daily Living provide alternative access to
  - battery operated devices
    - i.e. a toy
  - simple electrical devices
    - i.e. a fan

- or provide limited control of an infrared receiving device
  - i.e. television “channel up” command

Basic EADLs

Access

- Access
  - is almost always by switch

Goals

- To provide independent play
- To develop cognitive skills through this play
- Psychosocial
- To prepare for future assistive technology use

How does it work?

- Direct connection
- Intermittent control
  - Battery operated
  - Electrical
  - IR

Direct Connection

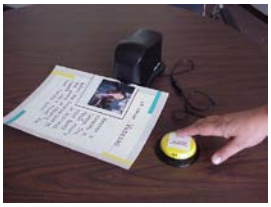
- Battery operated devices only
- Battery interrupter or pre-adapted
- Switch
- Requires sustained switch contact
- Good for preparing for power mobility



Intermittent Control

- Latch
- Timed seconds
- Timed minutes
- Requires intermittent switch activation
- Good for developing scanning skills

Battery Operated Devices



Intermittent Control of Electrical Devices

- Same advantages of Battery Operated Devices
- And more…
  - No batteries!
  - Increased variety of devices
    - May be more appropriate for teens and adults

Intermittent Control of Electrical Devices

- Will only work if electrical device turns on and off when plugged in or out of an outlet
  - Not electrical switches
  - i.e. fan vs. CD Player

Electrical devices

- blenders
- food processors
- fans
- coffee pot
- paper shredder
- lamp
- waterpik
- wave machine
- lighted mirror
- heating pad
- heating pad/vibrating
- stereos (mechanical buttons)
- hair dryer
- foot massagers (water)
- popcorn makers

Electrical Devices

Basic EADLs

- Simple Infrared Control
  - Typically IR control is done with Multifunction EADLs
    - More device and function control
    - More access methods
  - Basic EADLs can simplify task for clients who have limited control needs, limited cognition and/or limited finances

Basic EADLs

- Simple Infrared Control
  - Home audiovisual (AV) systems are quite complex
    - More than one remote may be required
      - TV: Power and Volume
      - Cable: Channels
    - Some systems cannot send both

Basic EADLs

- Simple Infrared Control
  - Some TV and Cable Remote Controls send both IR and Radio Frequency (RF) signals
  - EADLs cannot learn the RF signals and so cannot control those functions

IR Devices

- Infrared receiving devices
  - TV
    - Power On/Off
    - Channel Up/Down
    - Volume Up/Down
    - Mute
  - DVD
  - CD
  - MP3

Music Options

- Tapes are old school
- Radio – not a big demand unless you are in the car
- CDs are being replaced by song downloads
- MP3 is in

CDs

- Basic EADLs cannot control a CD player
- Switch adapted CD Players provide limited control
  - Enabling Devices

MP3 Files

- Several companies make large button or switch adapted MP3 players
  - Enabling Devices

DVD Players

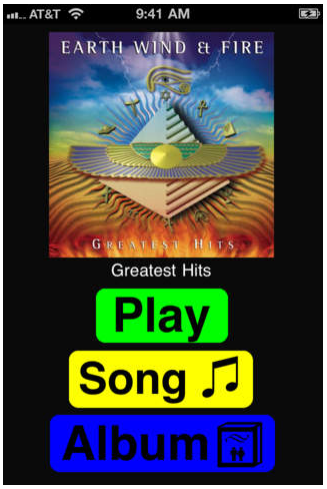
- RJ Cooper
- Switch Adapted portable DVD Player

What About Tablets?

- Apps are available to control devices in the environment, but primarily through wireless networks
- Complicated, high visual and cognitive requirements

EZ Tunes

- This App can be used on an iPhone or iPad
- Larger buttons to control iTunes



Multifunction EADLs

Multiple Output EADLs

- Provide control of a variety of devices and functions
- Typically use infrared and Insteon technologies

User Interface

- How can the client access the EADL?
  - Direct
  - Switch
  - Voice
  - Via a computer, Tablet or Smartphone
  - Via a speech generating device
  - Via a power wheelchair

EADL Applications

- What do EADLs control?
  - Audiovisual equipment
  - Electric hospital bed
  - Door openers
  - Telephone
  - Lights
  - Appliances: fan
  - Heating and air conditioning

Who can benefit from EADLs?

- Nearly all ages
  - children need control for play
- Any client who cannot independently control devices in the environment due to physical, cognitive and/or sensory issues

Environments

- Where can EADLs be used?
  - Home
    - i.e. stereo, bed
  - Work
    - i.e. lights, door
  - School
    - i.e. lights, automatic fish feeder
  - Community
    - i.e. elevators, door openers

Needs Assessment

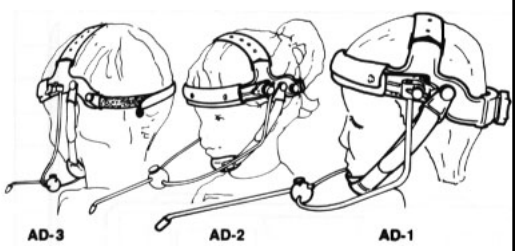
- Consumer
  - Goals - short and long term
  - Control needs - applications
  - Physical abilities
    - motor, endurance
  - Psycho-social issues
  - Cognitive skills
    - memory, sequencing, reading
  - Sensory skills
    - vision to see display

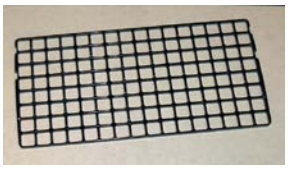
Needs Assessment

- Environmental considerations
  - Where will the EADL be used?
    - i.e. home
  - Does the EADL need to be portable?
    - i.e. use from wheelchair and bed
  - Will the client use the EADL in more than one room?
    - i.e. possibly use a transmission method that goes through walls

Direct Access

- Finger to button
- Pointer to button
  - Hand held pointer
  - Pointer in splint
  - Head or chin pointer
- Direct access assists
  - keyguard





Who can use Direct Access?

- Fair to good fine motor control
- Good vision to see buttons
- Literacy typically required

IR Remote Controls

- IR Remotes
  - A remote can be kept with the client so that the client does not have to go to the device if mobility is limited
  - Standard
  - Universal
  - Large Button
  - Simple

IR Remote Controls

- Tablets and Smartphones
  - Apps are available that can control specific TVs and Cable boxes.
  - An external hardware device is required to send the IR signal (Samsung Android built-in)
    - Plugs into Tablet
    - Hub
  - Much of the Cable Box control is through a wireless network
  - Requires reading, good vision, precise control

Telephones

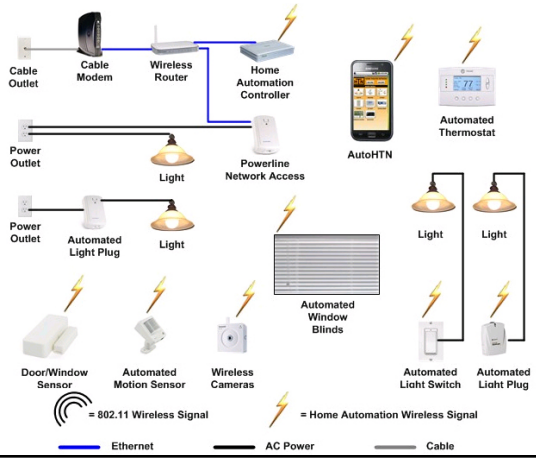
- Often a client can use a standard cell phone or cordless phone
- Advantage: phone can stay with client who has mobility limitations
- Large button phones

Module Control

- These technologies can control:
  - Lights
  - Simple appliances (i.e. fan)
  - Specialized Thermostats
  - Window A/C units
  - Electric Hospital beds (with adaptor)
  - Power door openers

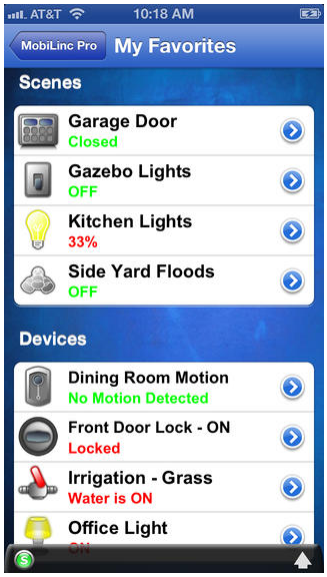
Module Control

- Technology that sends signals over the house wiring to turn on and off simple appliances, such as lights and fans



Module Control

- Tablets and Smartphones
- More Apps are coming out to control these modular systems
- Work on wireless network



Combination Systems

- Combination systems control IR receiving devices, provide module control (usually through X10) and sometimes other features
- May use dynamic screen to accommodate large amount of options

Switch Access

- Any switch can be used
- Switches can be placed at nearly any body site where the client has control
- Scanning

Who can use Switch Access?

- Adequate motor control to accurately reach, activate and release a switch repeatedly
- Good vision to see display
- Literacy typically required
- Memory and sequencing required to find and select functions in a hierarchy

Using SGDs as EADLs

- Many Speech Generating Devices send IR signals and can be used to control devices in the environment via switch access
- Usually more appropriate for non-verbal clients

Tablets

- Switch access is now possible on Tablets
- This can allow for navigation of EADL features by switch
- Wireless networks
- Requires reading, vision and good cognition at this point for most Apps
- Variety of Apps out there for audiovisual and modular control
- Strong potential here with the right App!

Specific Function EADLs

- Door Openers
- Phones
- Page Turners
- Call Systems

Voice Access

- Discreet voice commands execute specific functions within a hierarchy
- Consistent and clear speech
- Memory and sequencing required to find and select functions in a hierarchy
- If the client has a good memory, vision and literacy may not be required

Switch Back up

- Switch Back up is critical in case the client's voice is not recognized due to:
  - Fatigue
  - A cold
  - Choking
  - Change of position

Computer Based

- Several voice accessed EADLs are actually computer based systems which offer Dragon Naturally Speaking as an input method

Take Home Message:

- Many clients lack independent control of devices within their environment
- Basic control is a safety issue, particularly phone and door
- Independent control is an important therapy goal

Resources

- www.atilange.com under Resources
  - Multifunction Electronic Aids to Daily Living Comparison Chart
  - Basic Electronic Aids to Daily Living
  - Telephones, Personal Emergency Response Systems (PERS) and Pagers
  - Adaptive Toys Handout

Hands-on Activity

- Go to the listed EADL resources and check them out
- Download a free App on your tablet or smartphone to control something in your home and explore

Activity Time!

Thank You!

Contact Information

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