DEPARTMENT OF HUMAN SERVICES

LiveLife THERAPY SOLUTIONS

Adaptive Gaming

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Background

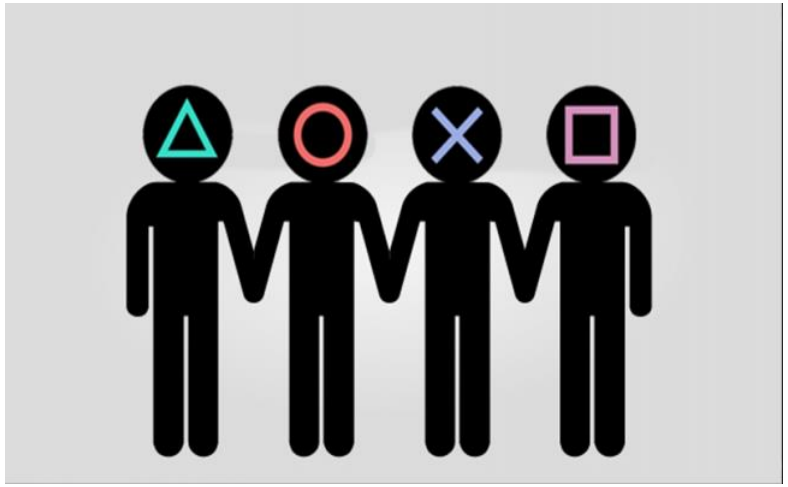
Drew Redepenning

- Biomedical Engineer/ATP
- Former AT Specialist at CKRI
- Current AT Specialist at Technology for HOME
- AT volunteer at CKRI and St. Margaret's Center (NY)
- MD student at Albany Medical College (NY)

Introduction to Adaptive Gaming

Why is Adaptive Gaming Important?

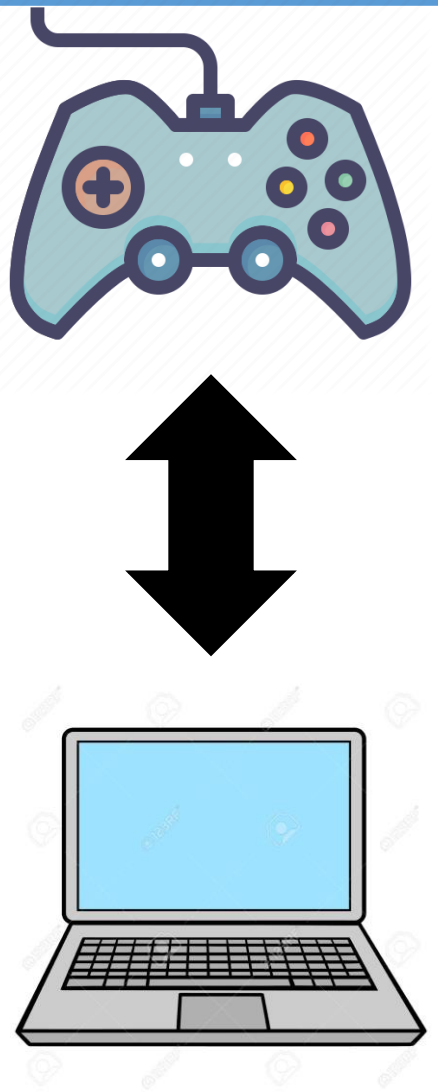
- **Social Benefits**
  - Playing games with friends and family locally and online
  - Gaming has grown into an online community allowing people of all backgrounds to interact
- **Functional Benefits**
  - Adaptive gaming can translate to many skills and activities other than just gaming alone
- **Improves Quality of Life**
  - Social interaction, participation, independence, fun



Functional Translation of Adaptive Gaming

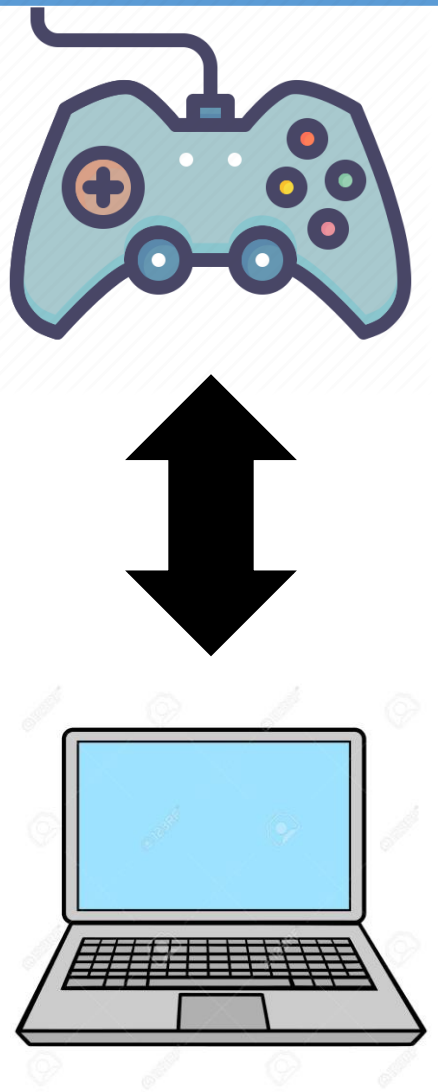
- **Gaming equipment can be used for applications other than just gaming**
  - Computer Access
  - Communication
  - Environmental Controls
  - Work and school

- **Important reasons for looking at gaming equipment for other assistive technology needs**
  - Increased motivation to use equipment
  - Increased skill using equipment
  - More options for funding adaptive gaming equipment



Introducing AT Through Adaptive Gaming

- **Learning to use assistive technology equipment can be frustrating**
- **Adaptive gaming provides a fun way to learn to use adaptive equipment that can be later used for alternative purposes**
- **Many individuals use their adaptive gaming equipment for computer access and other areas for daily independence**



Controllers

Types of Limitations Accessing a Controller

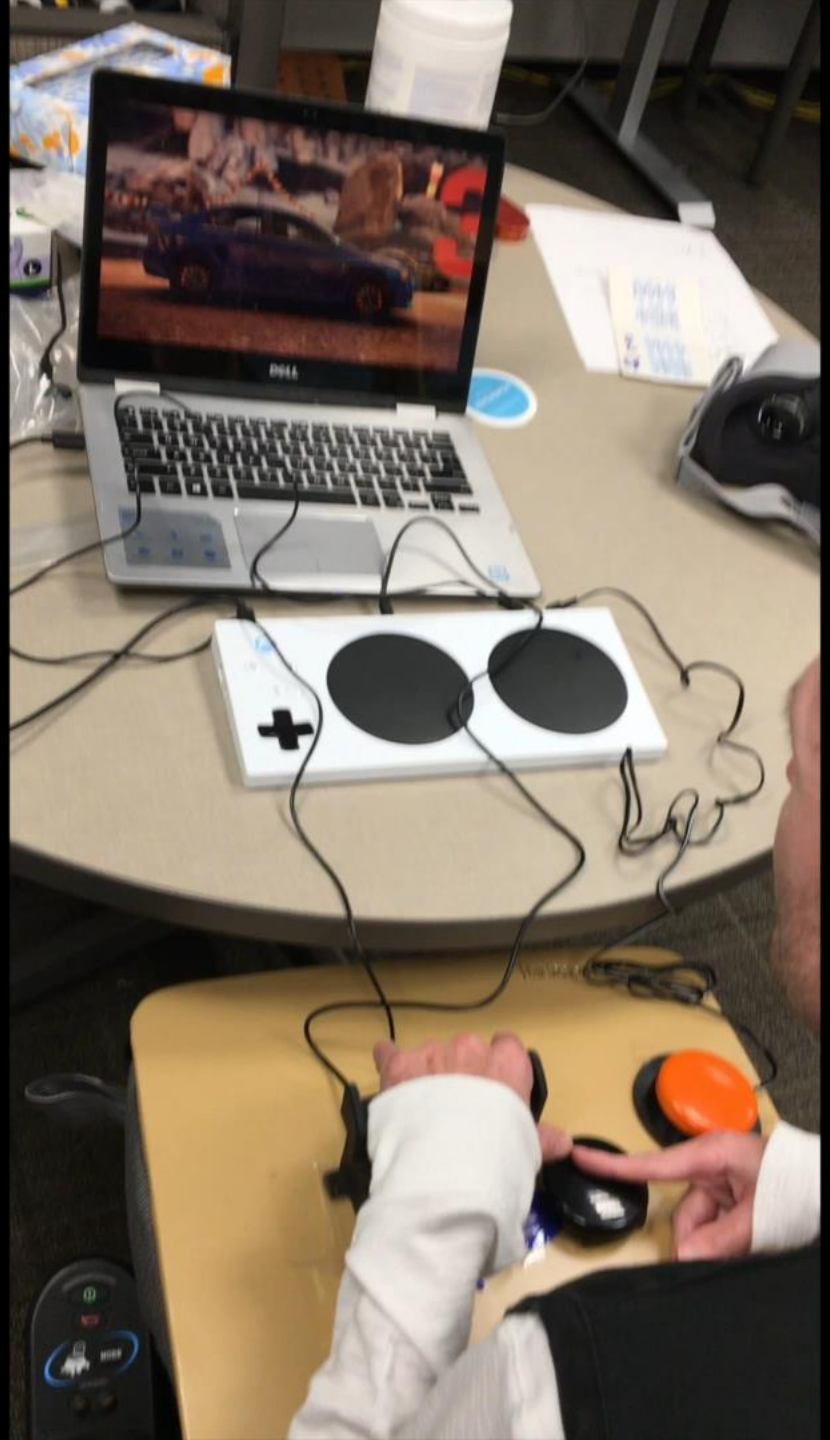
- **Difficulties with movement, posture, and coordination**
- **Purely Motor**
  - Somewhat Limited
  - Significantly Limited
  - Extremely Limited
- **Movement Disorders**
  - Uncontrolled movements
  - Won’t be talking about these today

Difficulties with Movement and Coordination

- **Uncoordinated movements and difficulty with posture**
  - Cerebral Palsy
  - Not enough control to quickly access targets or access joysticks and buttons on controller
- **Controller options with larger targets**
  - Xbox adaptive controller or Hori flex
  - May need to start with games with fewer controls
  - May need to start with games that don't require timing (depending on ability of user)

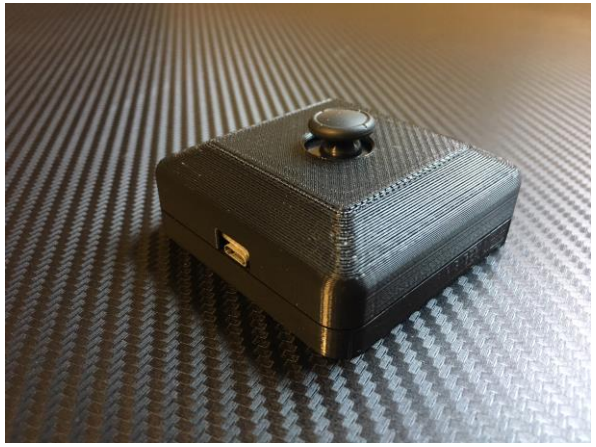
Xbox Adaptive Controller

- Xbox gaming rig that allows users to plug in accessibility switches and joysticks for controller inputs
- Can connect large joysticks and buttons that will be easier to access
- If using the XAC alone:
  - May need to play games with fewer controls
  - May need to start with games not requiring speed
- https://www.xbox.com/en-US/accessories/controllers/xbox-adaptive-controller

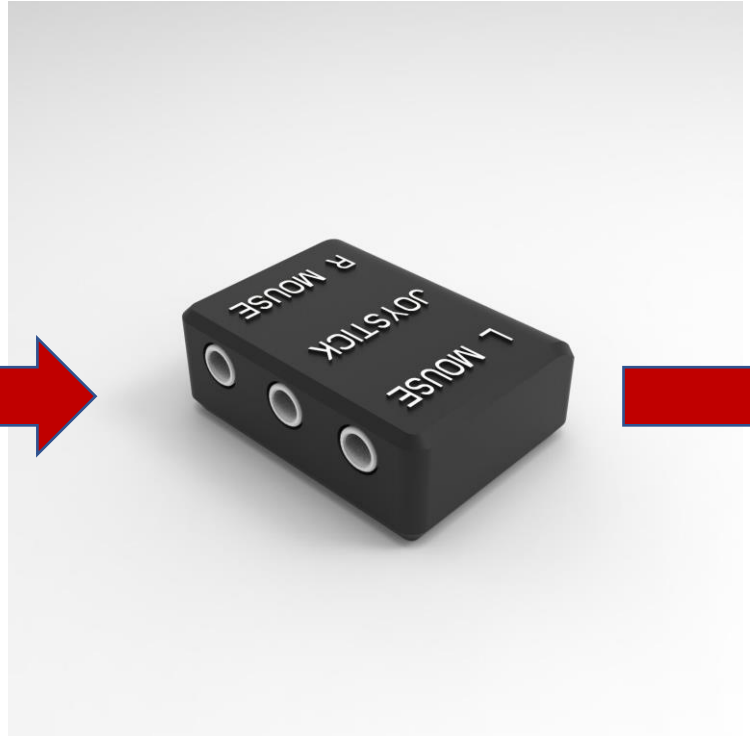


Connections to Xbox Adaptive Controller

- **Warfighter Engaged**
  - 3D printed joysticks and switches
  - https://warfighterengaged.org/shop
- **Logitech**
  - Affordable set of adaptive switches
  - https://www.logitechg.com/en-us/products/gamepads/adaptive-gaming-kit-accessories.943-000318.html
- **Evil Controllers**
  - Thumb joysticks and string switch
  - https://www.evilcontrollers.com/store?cat=253
- **X-Keys**
  - Joystick compatible with XAC and adaptive switches
  - https://xkeys.com/xkeys/switches-pedals/buttonswitches.html
  - https://xkeys.com/adaptivejoystick.html
- **Quadstick**
  - Joystick compatible with XAC
  - https://www.quadstick.com/shop/ultimarc-utrastik-360-enclosure
- **Microsoft Store**
  - Switches and joysticks compatible with XAC
  - https://www.xbox.com/en-US/accessories#assistive

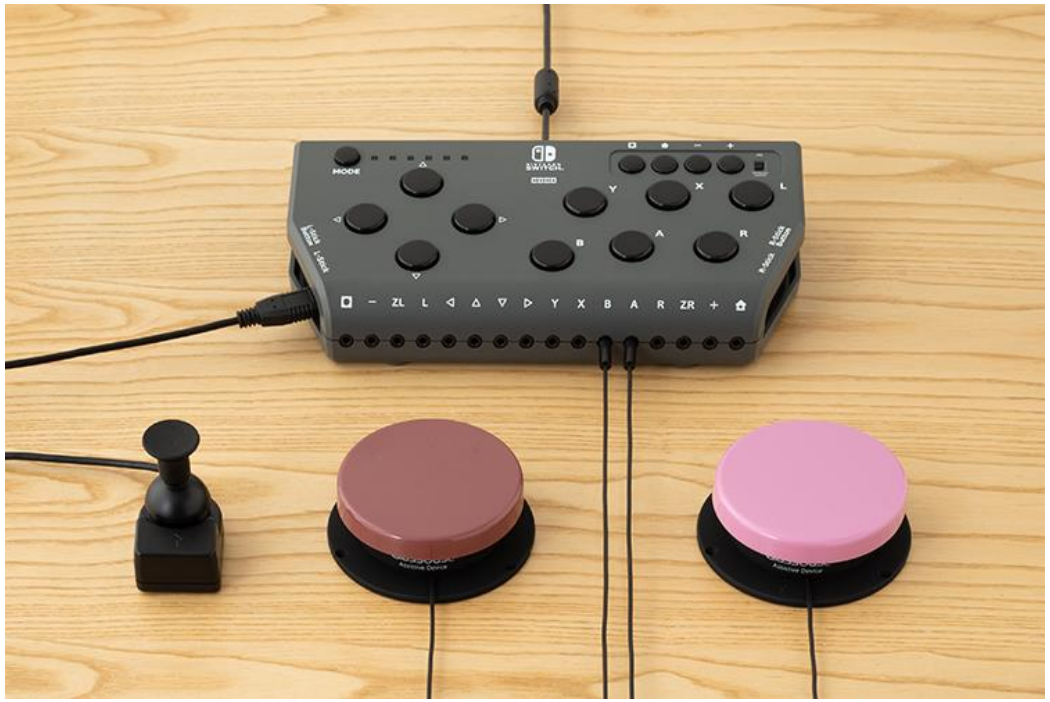


Mouse Control



Hori Flex Controller

- Similar to XAC, adaptive joysticks and switches can be plugged in for controls, but for Nintendo Switch Console
  - Not as many adaptive joystick options as with XAC
  - Much better app for changing controller settings than XAC, can customize button behaviors
- Nintendo Switch games are much easier to play, so may be better for some gamers
- Can be used alongside Eyegaze
  - Great for players with extremely limited mobility
- Costs more than XAC ($250 vs. $100)
- https://ablegamers.shop/products/hori-flex-controller



Hori Flex Controller Compatibility

- **Compatible Joysticks** (Very Limited)
  - Optima Joystick, from Pretorian Technologies
  - Horipad for Nintendo Switch
  - Real Arcade Pro V Hayabusa for Nintendo Switch
  - Battle Pad for Nintendo Switch
  - Nintendo Switch HORIPAD Mini
- **Same compatible switches as XAC**
  - Use 3.5mm jacks
  - More built-in switch buttons

Mobility: Somewhat Limited

- Trouble accessing some buttons
  - Duchene's Muscular Dystrophy, Lower Cervical Level Spinal Cord Injury, One-handed users, Cerebral Palsy
  - Trouble accessing buttons in certain locations on the controller
  - Can access one or both joysticks
- Controller options that have buttons in different locations or on one side of controller
  - Evil Controllers
  - Xbox controller w/ XAC on co-pilot

Evil Controllers

- Provide controllers with simple adaptions for those who have difficulty accessing specific buttons/joysticks on a standard controller
- Controllers with buttons in different locations, external joystick, one handed controllers, reduced button and joystick resistance
- Great for those who can partially access a standard controller, but with difficulties accessing specific controls
- Joysticks can be fragile so not best for gamers that are rough on controllers
- Can adapt PS5 and Xbox Series X Controllers
- Price ranges from $100-200 depending on adaptions
- https://www.evilcontrollers.com/store?cat=253

Co-pilot with XAC

- **Co-pilot is a setting that allows two controllers to act as one on the Xbox console**
  - No other console has this capability
- **A standard controller can be used alongside co-pilot with the XAC**
  - Allows external switches to be used for difficult to access controls
  - Allows controls to be set up on alternative areas of the body
- **Nintendo does not have co-pilot**
  - Can’t use with Hori Flex
- https://support.xbox.com/en-US/help/account-profile/accessibility/copilot

Mobility: Significantly Limited

- **Trouble Accessing Most Buttons**
  - Spinal Cord Injury, Individuals with Quadriplegia
  - May have some upper extremity movement in arms but don't have a lot of fine control for small buttons
- **Most likely need sip-and-puff controller**
  - Quadstick will allow enough controls to play virtually any game
  - Can use other attachments if needed
  - XAC or Hori Flex will not be good options in general (even if they have some upper extremity movement) unless they want to play games with fewer controls

Quadstick

- A combination of sip-and-puff, head control joystick, and chin control switch all in one
- Can be used for access to computers, TV, gaming, phone, tablet, or infrared devices
- Programmed through the Quadstick Manager Program
- FPS model is best for gaming
- Costs $550 (which is much cheaper than most sip-and-puff controllers on the market)
- https://www.quadstick.com/shop/quadstick-fps-game-controller

left_1	normal	mp_right_center_sip
right_1	normal	mp_right_center_sip
left_2	force_off	mp_left_center_sip
left_joy_down	toggle	mp_triple_sip

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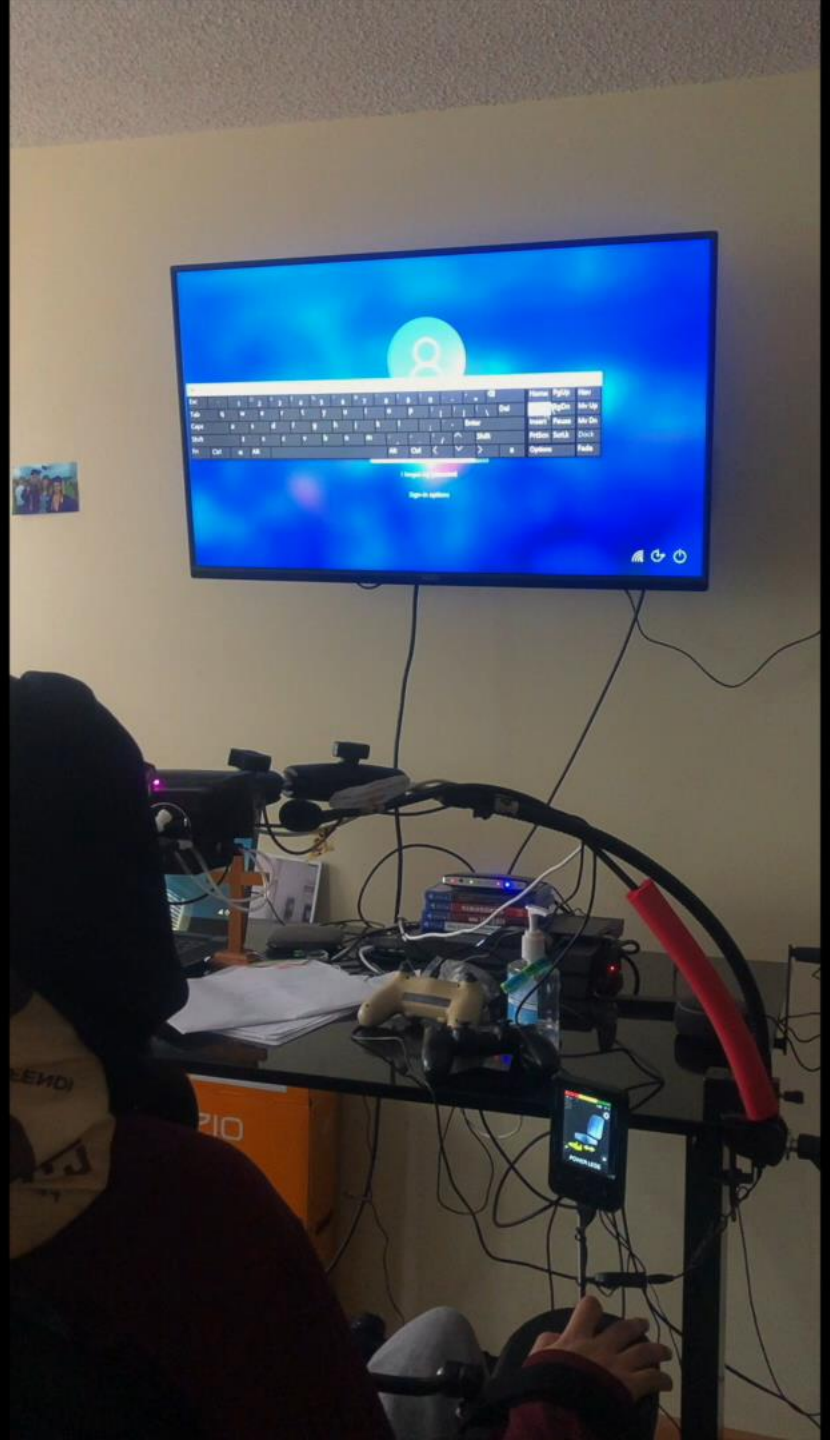
Quadstick Customization

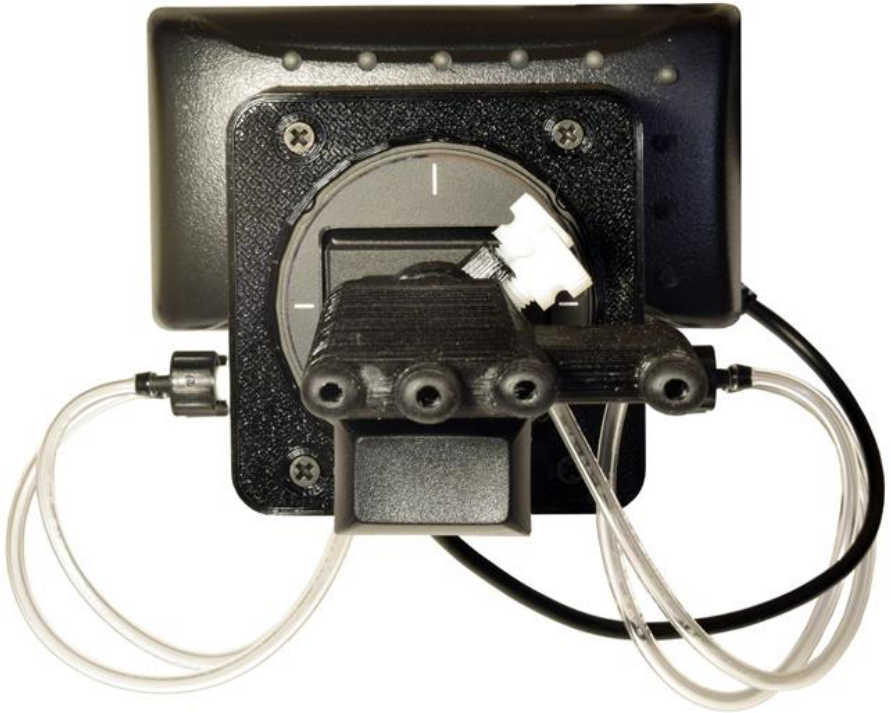
- **The Quadstick is by far the most customizable adaptive controller on the market**
  - Nearly anything can be customized on the Quadstick to meet a user's needs
  - With proper programming of the Quadstick a user can play nearly any game on any console
  - The Quadstick is a very technical device, and learning to program it can be difficult
  - **Pre-made profiles can be downloaded to the Quadstick for many games**
    - Don't need to know how to create profiles from scratch
    - Only need to understand controls, teach users, and maybe adjust some controls
- **Resources for learning programming on Quadstick:**
  - http://quadstick.s3.amazonaws.com/documents/user_manual/um/index.htm
  - https://www.youtube.com/watch?v=clVTGWkDczo&list=PL1XLv6BH-ouICIxtxRkzfST2culLVu5fK
  - https://www.youtube.com/watch?v=Jo1-m8g21wA&list=PLWaNRPOGO-VCx0bhC6kSd3MWJacKiojO9



Mobility: Extremely Limited

- **Limited neck movement or respiratory control**
  - Duchene's Muscular Dystrophy, High Cervical Level Spinal Cord Injury
  - Can't access all inputs on Quadstick (due to mobility and respiratory strength)
- **Need to be more creative with set up but things get more complicated**
  - Quadstick with attachments
  - Eyegaze
  - Voice Access

Connections to Quadstick



The Quadstick can be used alongside other joysticks and switches, which can be plugged into the inputs in the back of the device.

PDP One-Handed Joystick

Switches

Peripad-504 Touchpad

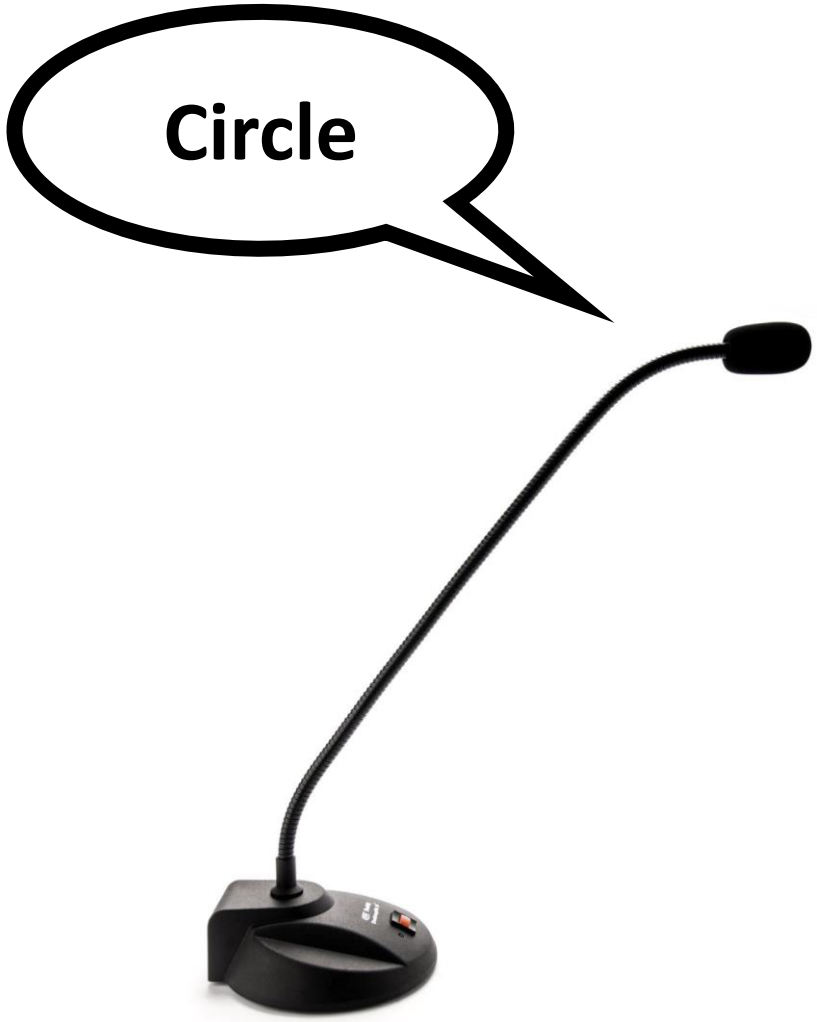
Eyegaze

- **Hori Flex**
  - Can be used on PC computer or with Nintendo Switch
  - Works with Tobii Eyetracker 5
  - Program can be used to create customizable virtual buttons that can be activated with eye control
  - https://www.ttools.co.jp/product/hand/fcea/files/manual_fcea_en_v1220.pdf
- **Project Iris**
  - Eyegaze program for gaming that runs on PC computer
  - Works with Tobii Eyetracker 4C, not sure yet if compatible with Eyetracker 5
  - Mostly for PC games, but can be used for console game alongside Quadstick
  - https://iris.xcessity.at/index.php?form-success

Eyetracker 5: https://gaming.tobii.com/product/eye-tracker-5/

Voice Control

- **Voice Attack**
  - Runs on PC computer, primarily for PC games
  - Can create custom voice commands for PC controls
  - https://voiceattack.com/Default.aspx
- **Vocola with Quadstick**
  - Program that runs alongside Quadstick and Dragon Naturally Speaking
  - Can create custom voice commands for PC and console games
  - http://quadstick.s3.amazonaws.com/documents/user_manual/um/voice_control_tab.htm
- **Alexa**
  - Not really great for gaming but an option



Connecting Controllers

Adapters

- Adapters can be used to use a specific controller supported by one console on another console
- Adaptive mice and keyboards may also interface with adapters for use on consoles
- **Brooks Converter**
  - Best for Xbox console
  - https://www.quadstick.com/shop/brook-super-converter-ps3ps4-to-xbox-one
- **Titan 2**
  - Can pretty much work with any console
  - https://www.amazon.com/gp/product/B07SXBW6XC
- **Cronus Zen**
  - Can pretty much work with any console
  - https://shop.cronusmax.com/zen.html
- **8BitDo Adapter**
  - Nintendo Switch only
  - https://www.amazon.com/dp/B09M8CVMYF

Brooks Converter

8BitDo Adapter

Titan 2

Cronus Zen

Connecting the XAC

CONSOLE	ADAPTER	DIRECTIONS
XBOX ONE OR SERIES X	No	Plug and play
PC GAMING	No	Plug and play
NINTENDO SWITCH	Yes (8BitDo or Cronus Zen)	https://support.8bitdo.com/Manual/USB-Adapter-2/xbox-switch.html
PLAYSTATION 4	Yes (Titan 2 or Cronus Zen)	https://guide.cronusmax.com/systems/ps4-console

Connecting the Hori Flex

CONSOLE	ADAPTER	DIRECTIONS
XBOX ONE OR SERIES X	Yes (Cronus Zen)	https://guide.cronusmax.com/systems/xbox-one-console
PC GAMING	No	Plug and play
NINTENDO SWITCH	No	Plug and play
PLAYSTATION 4	Yes (Cronus Zen)	https://guide.cronusmax.com/systems/ps4-console

Connecting the Quadstick

CONSOLE	ADAPTER	DIRECTIONS
XBOX ONE OR SERIES X	Yes (Brooks)	http://quadstick.s3.amazonaws.com/documents/user_manual/um/brook_accessory_wingman_xb.htm
PC GAMING	No	Plug and play (when programmed for PC)
NINTENDO SWITCH	No (Mode 5)	http://quadstick.s3.amazonaws.com/documents/user_manual/um/nintendo_switch.htm
PLAYSTATION 4	No (Mode 4)	http://quadstick.s3.amazonaws.com/documents/user_manual/um/ps4.htm

Connecting to PlayStation 5

- **Only partially supported**
  - All controllers can be used with adapter on PS5
- **Can use Titan 2 or Cronus Zen**
  - Need authentication controller plugged into side of Cronus Zen and Titan 2 that “tricks” PS5 into thinking that it is a supported controller (Hori PS4 Mini pad or Zen PS5 Dongle)
  - **How to connect with Cronus Zen:** https://guide.cronusmax.com/systems/playstation-5
- **Some games work and some don’t**
  - Titan 2 and Cronus Zen are working to make PS5 games fully supported but no ETA as of now
  - **Spreadsheet for supported games:** https://docs.google.com/spreadsheets/d/10NNxAjgEXER_11V2g95obGNQIMgvctghX0HL1yM94ZQ/edit#gid=0

Selecting Games

Why is choosing the right games important?

- **Some games are easier to play than others**
  - Fewer controls
  - Don’t rely as much on speed
  - Less complicated gameplay
- **Important to know which games are easier to start with on a new controller**
- **Some games are difficult to play with certain controller set ups**
- **Some controllers don’t require starting with easier games**

Tips for Choosing Games to Start With

- **Quadstick**
  - Need to start with simpler games, then can progress to more difficult games
- **Evil Controllers**
  - Can start with any game most of the time
- **XAC controller**
  - Might be limited to simpler games if using XAC alone
  - Might need to start with simpler games if using standard controller with co-pilot until user gets used to set up
- **Hori Flex**
  - Might be limited to simpler games depending on set up
  - Eyegaze will require simpler games

What makes games difficult to play?

Easy	• Single joystick games with two or three buttons • Don’t require speed • A lot of Nintendo games
Intermediate	• Faster pace single joystick games with more buttons • Slower pace two-joystick games with more controls
Hard	• Two-joystick games that are fast paced • Require a lot of controls to play • Pretty much any first-person shooter game
Extremely Hard	• A lot of control combinations • Online only games

Games Based on Difficulty

Easy	Intermediate	Hard	Very Hard
Super Smash Bros	Need for Speed	Kingdom Hearts III	Apexa Legends
Pokémon	FIFA	Battlefront 2	Fortnite
Mario Kart	Madden	Grand Theft Auto	Online COD
Animal Crossing	Minecraft	Call of Duty	Red Dead Redemption
Lego Games	Plants vs. Zombies	Halo	Marvel's Spiderman
Rockey League	Spyro	Skyrim	Star Wars Jedi: Fallen Order
The Sims	Astroneer	God of War	Overwatch
Injustice 2	Portal 2	The Last of Us 2	
Marvel vs. Capcom	Final Fantasy	Battlefield	
Driving Games	The Walking Dead	Guardians of the Galaxy	
World of Warcraft	League of Legends	Ratchet and Clank	
Roblox			
Among Us			

How to Approach Gaming Assessments

Age and Experience with Gaming

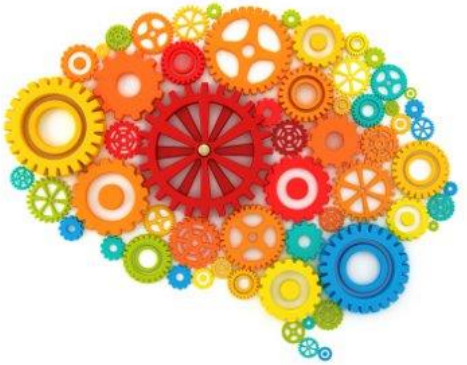
- Client age and experience with gaming will dictate the training process for the adaptive gaming equipment
- Experience is the most important factor:
  - No experience with gaming
  - Experience gaming a long time ago
  - Significant experience with gaming and recent injury
  - Significant experience with gaming through alternate access method
- Age is less important but should still be considered, especially in the case of no past gaming experience

Types of Games and Goals

- The type of games that the user wants to play and goals for gaming will influence controller selection, set up, and training process
  - Single joystick vs. 2-joystick games
  - Slow pace vs. fast pace games
  - Offline vs. online play
  - Types of games: first person shooter, arcade style, racing, adventure games, and others

Functional Abilities and Cognition

- Functional abilities will primarily dictate controller or access method selection. Choice of games should not be dictated by functional abilities unless access options are extremely limited.
- Cognition will dictate controller selection, game selection, and training process. Complex controllers and games will be difficult and frustrating for someone with significant cognitive deficits. Start easy then add as skill develops.

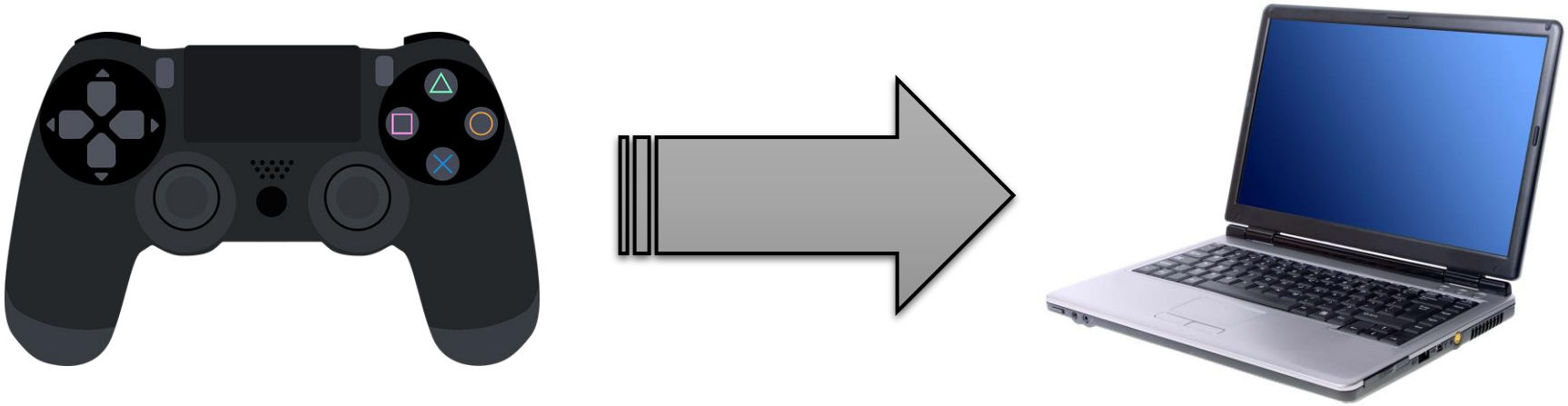


Personal Factors

- Motivation is an important factor for game selection and training process
  - Difficult games can be discouraging and frustrating
  - Start with easier games then progress as skill develops
  - Do not start with online play
  - When initially introducing a controller, frustration should try to be minimized as much as possible
  - Be realistic with the client about how long it will take to build skill with the controller and what level of skill they can expect

Additional Assistive Technology Needs

- Additional assistive technology needs should be considered when looking at controllers
- Controllers that will also be used for computer access (or other functional needs) will be easier to get funded
- Gaming will help build skill and motivation with the equipment when it is used for other needs



Questions?

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