

Switch Access, Vision Challenges, Complex Communication Needs and Literacy Learning - Electronic Tools



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Financial Disclosures

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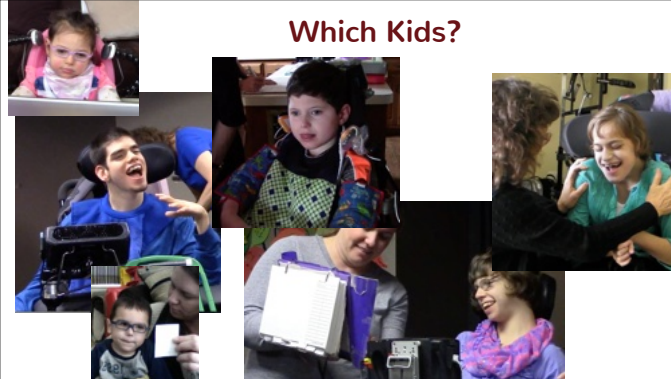


- Self-Employed
- Paid Consultant and Trainer
- Small Home Business (books and software activities for Mind Express by Jabbla)
 - Steps Before Step Scanning
 - Switch On Literacy
- Work with children, families and teams privately
- Volunteer consulting to AT Vendors and product developers

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Which Kids?



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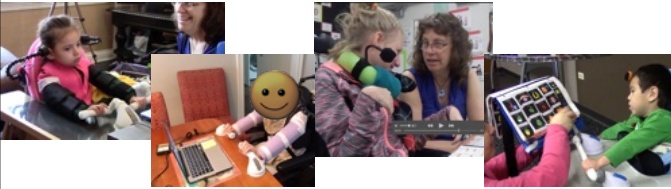
Complex Communication Needs

- Access often limited to auditory-plus-visual scanning or auditory-only scanning
- May or may not have access to learning a robust aided-language system - **So this becomes a priority!!!**
- Literacy depends upon language as the foundation



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Severe Physical Challenges



- Limited ability to use direct selection with hands
- Hand use limits ability to actively explore tactile symbols (Such as Braille)

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Vision Challenges that Significantly Impact Ability to Discriminate and Read Text



- Ocular disabilities
- Cortical/Cerebral Visual Impairment (CVI)
 - Range of visual abilities: Currently Phase 1 and early Phase 2 on CVI Range (Roman-Lantzy)
 - Visual complexity is still a big challenge

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CVI: Development of Use of Vision for Literacy

- Each individual with CVI is different with different challenges
- Vision may grow over time, however, vision must not hold back literacy learning
- Use of visual supports should match the individual's current visual abilities

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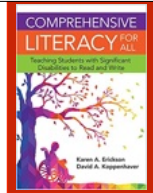
CVI: Development of Use of Vision for Literacy

- Acknowledge, that vision may fatigue throughout the day
- Complexity of the multi-sensory environment will impact how much vision may be used at a given time and place
- Other modalities: auditory and tactile may take the lead, when vision fatigues, is is not yet developed enough

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Underlying Philosophy on Current Best Practices for Comprehensive Emergent Literacy Instruction:

- Alphabet Knowledge & Phonological Awareness
- Shared Reading
- Independent Reading
- Writing



Karen Erickson and David Koppenhaver
 Center for Literacy and Disability Studies
<https://www.med.unc.edu/ahs/clds>
 Jane Farrall Consulting
www.janefarrall.com

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Stong Emphasis on Alphabet Knowledge & Phonological Awareness plus Explicit Phonics Instruction

- With limited reliability on visual discrimination of letter shapes, these individuals need:
 - More emphasis on auditory discriminations of phonemes
 - More emphasis on auditory associations of letter names and sounds
 - More practice with developing an inner voice
 - More models of blending and segmenting words into sounds in conjunction with frequent practice saying them in their heads

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Emergent Literacy Learning Shared Beliefs and Shared Understandings

- Active engagement and exploration of literacy concepts, with feedback is critical
- No prerequisites - All children deserve comprehensive literacy instruction
- Concepts develop over time (learning in different areas is concurrent and recursive)
- Engaging in literacy rich experiences is prioritized over testing or drilling
- Literacy instruction should be comprehensive

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Good comprehensive literacy instruction includes:

- knowledgeable and observant teachers
- explicit teaching
- embedded exploration problem-solving and instruction
- practice for real purposes
- less focus on mastery
- focus on targeted, but student driven curiosity and active exploration of concepts, with strategic feedback

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Technology should never be used for testing until the individual has become completely automatic with the motor operation, (Stepping Stone 8 - automaticity) so that full attention may be focused on the content

- Even then, fatigue, increased time factor, environmental conditions, bodily state, comfort, etc. will likely impact performance
- These individuals will frequently require more input than output for learning and more teaching than performing directed tasks independently
- The aim should be to provide opportunities for exploration of concepts with feedback, that enhances and extends classroom instruction, but never takes the place of it.

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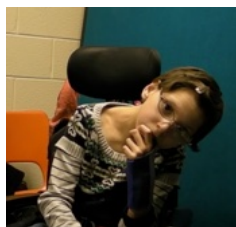
Active Learning

- Listening is often passive and is often insufficient for learning
- Active engagement is critical
- Correct level of challenge - Needs to be familiar enough, but somewhat new to hold interest
- motivation / interests / natural contexts



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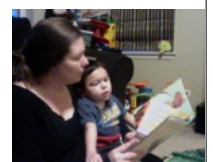
Active Learning is not Just Answering Questions - Need to put Child in Control



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Tools do not Teach Literacy!!! People do!

- Literacy is learned through rich, varied, interactive experiences with people
- Strategies such as shared reading, shared writing, predictable chart writing, etc. require interacting with a person, not just a device
- Knowledgeable teachers plan and conduct appropriate emergent literacy experiences for each student



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Many Times, Non-Electronic Academic Modifications can be More Effective and Interactive

Used in parallel with electronic supports

Testing adaptations

Writing with the Alphabet "adapted pencil"

Customized presentation of text

Reduced quantity of work

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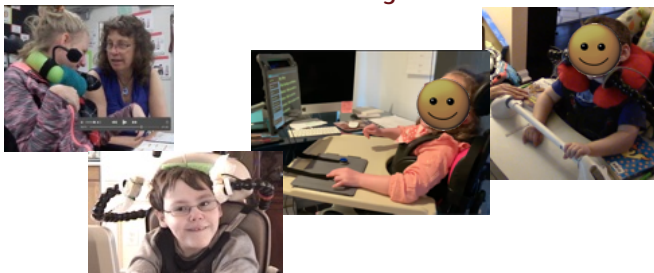
Electronic tools can enhance good comprehensive literacy instruction

- Provide a means to actively / independently explore concepts
 - Alphabetic Knowledge
 - Phonemic awareness
 - Writing for a purpose
 - Reading/Listening to digital books independently
 - Videos and sound feedback can enhance learning
- Scribble with the alphabet with auditory feedback
- Student-specific customization of activities based upon the child's interest and concepts being learned
- Co-planning with student when creating electronic activities



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Cognitive, Motor and Visual Load are all high for children who have severe physical challenges plus vision challenges



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Juggling Act

- Many things to juggle for both the student and team working with the student
 - motor
 - vision
 - communication
 - interaction
 - academic learning



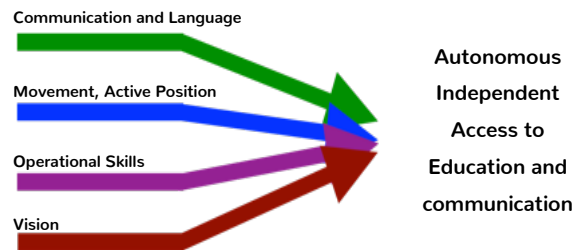
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Juggling Explains Inconsistency of Performance



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Parallel Learning



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Team Planning and coordination is Critical Everyone needs to be moving in the same direction - long term

- Everyone needs to know enough from other team members to:
 - Understand and use the child's means of communication
 - Know how the child is learning to move and recognize helpful vs harmful positions and movements
 - Understand what factors influence best use and development of vision
 - Recognize and address dysregulation- know how to address sensory needs on the spot
 - Recognize and address visual fatigue - know what works for each individual
 - Incorporate what best facilitates learning for each child (processing differences, learning needs)

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Always Balance Cognitive, Language, Motor and Visual Difficulty



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Only one "hard" at a time



Hard	motor
Easy	academic language vision

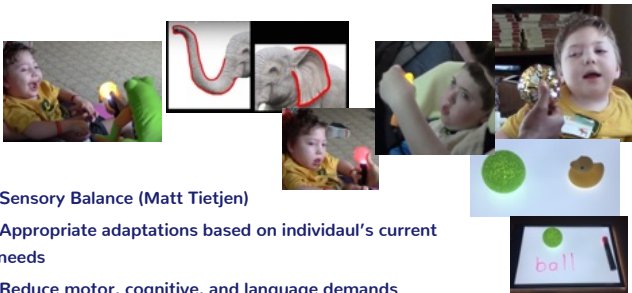
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Team Planning and coordination for consistency - everyone moving in the same direction - long term

- Focus on one component or skill with each activity
 - Reduce motor load for difficult cognitive, language, or visual tasks
 - Reduce visual load, for challenging cognitive, language and motor tasks
 - Reduce cognitive load for difficult motor learning, language focused, or vision focused tasks
 - Teach access as a separate but parallel skill

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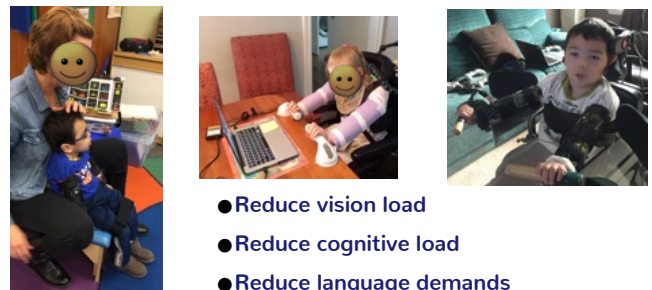
Vision Development



- Sensory Balance (Matt Tietjen)
- Appropriate adaptations based on individual's current needs
- Reduce motor, cognitive, and language demands

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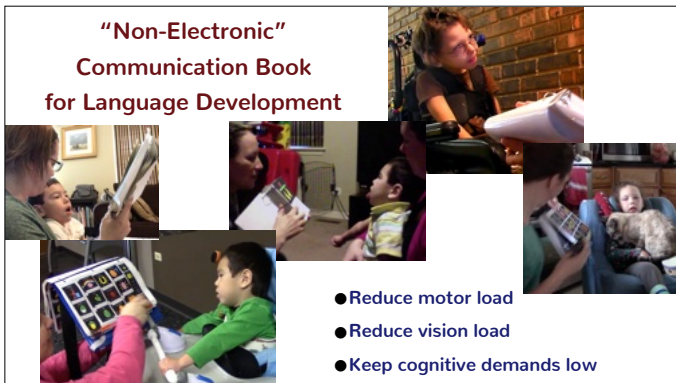
Developing Motor Control and Active Stability



- Reduce vision load
- Reduce cognitive load
- Reduce language demands

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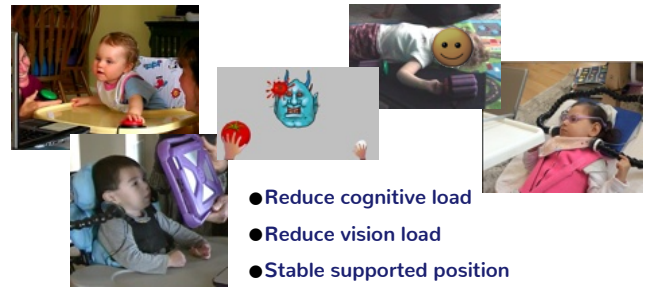
"Non-Electronic" Communication Book for Language Development



- Reduce motor load
- Reduce vision load
- Keep cognitive demands low

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Switch Play to Develop Motor Skills for Switch Access



- Reduce cognitive load
- Reduce vision load
- Stable supported position

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Stepping Stones to Switch Access - Strategies to Provide Children with Developmental Problem Solving Experiences



(Burkhart)

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Stepping Stones to Switch Access

(Burkhart)



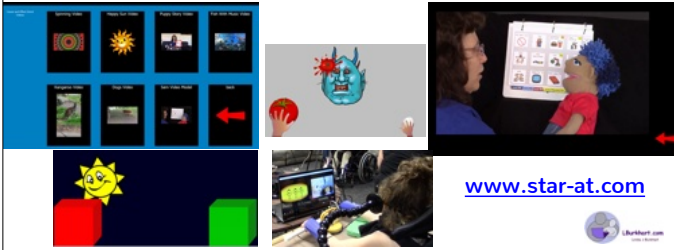
- Step 1: Single Switch: Cause and Effect
- Step 2: Single Switch: Multiple Locations, Multiple Functions
- Step 3: Two Switches / Two Functions
- Step 4: Learning to Two Switch Step Scan (move, move, get)
- Step 5: Two Switch Step Scan (Failure free with feedback)
- Step 6: Two Switch Step for Desired Targets
- Step 7: Practice for Increasing Accuracy
- Step 8: Switch Automaticity may now be used for access for a variety of functions

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Mind Express: Steps Before Step Scanning

(Burkhart)

<https://lindaburkhart.com/steps-before-step-scanning/>



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No One Starts with Automaticity of Movement

Motor Skills are Learned

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When you do something fast, you can only use motor skills that you have already developed to automaticity....



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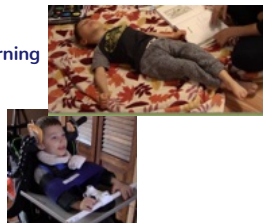
When you do something fast, you can only use motor skills that you have already developed to automaticity....

You can not improve or refine your motor patterns without slowing down and attending to what you are doing

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When a child's only option is to use a current automatic motor pattern

- Automatic movement patterns will not get better in quality, simply through repeated use
- Attention to movement is required for learning
- Supports and Learning are needed to
 - Begin in a healthy position
 - Learn to move in a healthy pattern



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What Does Research Say About Learning a Motor Task?

- Initiation of intent must come from within the child
- Problem solving opportunities for trial and error
- Practice and repetition with a purpose
- Thousands of repetitions with variation

Hanser and Burkhart

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Developing Automaticity for switch access takes practice:
Thousands of Repetitions with Intent, Purpose, and Variation

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Remember!

Switch access must reach a level of automaticity before anyone can be expected to use it for assessment, testing, or measuring any sort of cognitive understanding of concepts

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Eventually: Combine Motor, Language, and Vision Skills to Independently Operate a Robust Communication Device and Access Academic Software



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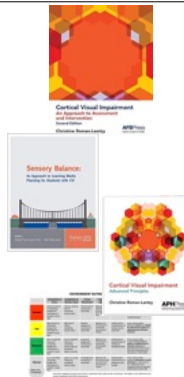
This presentation will assume basic knowledge of CVI

- ★ Vision impairment caused by brain damage or difference - not problems at the eye (however the child may have both)
- ★ Children's vision may improve with appropriate intervention in terms of materials used, how they are presented and environmental conditions
- ★ Individual Assessment is critical, because characteristics vary for each child and change over time resulting in different intervention needs

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CVI Resources:

- Dr. Christine Roman- Lantzy's CVI Range: Roman-Lantzy, C. A. (2007, 2018). Cortical Visual Impairment: An Approach to Assessment and Intervention. New York: AFB Press) www.afb.org/store
- Numerous online webinars and videos by Dr. Christine Roman-Lantzy related to the CVI Range (both free and paid)
- Sensory Balance, Christine Roman-Lantzy and Matt Tietjen



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CVI Range (Roman-Lantzy)

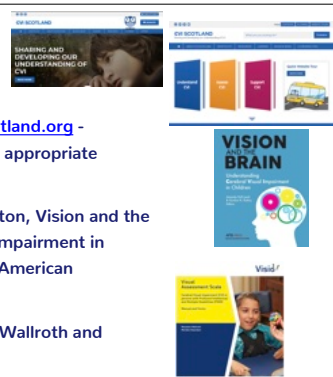
- Designed to be a functional vision assessment specifically for children with CVI
- Quantifies 10 characteristics of CVI
- Scores severity from 1-10
- Describes 3 Phases of visual functioning
 - Phase I (levels 1-3) Building visual function
 - Phase II (levels 3+ to 7) Integrating vision with function
 - Phase III (levels 7+ to 10) Refinement of remaining CVI characteristics
- Suggests appropriate interventions for vision and visual development based upon score



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More Resources:

- Gordon Dutton: CVI Scotland viscotland.org - extensive website explaining CVI and appropriate strategies.
- Amanda Hall Lueck and Gordon Dutton, Vision and the brain: understanding cerebral visual impairment in children, New York, NY : AFB Press, American Foundation for the Blind, (2015)
- Visual Assessment Scale (Marjolein Wallroth and Marieke Steendam)



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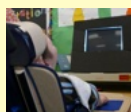
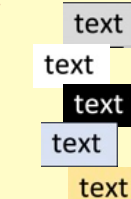
CVI Characteristics and Electronic Access

- How can the individual's CVI characteristics be supported through electronic presentation of Literacy Skills?
- What strategies may be Used to accomodate and compensate for visual challenges related to CVI?
- For this presentation, examples of supports are taken from: Switch On Literacy (Mind Express / Burkhart) (see disclosure)

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Light gazing or need for light (also light sensitivity)

- Manually adjust screen brightness - brighter or dimmer
- Consider a gray background or other soft color behind objects or text instead of bright white
- Pay attention to glare on the screen and other lighting sources in the environment



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Visual field differences & Difficulty with distance viewing

- Physical position of screen
- Mounting options for optimal placement
- Splashtop, Team Viewer, Join Me - mirror computer screen on iPad/ tablet to bring closer to child and position for best viewing



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Color Preference

- In CVI phase 1: **color** encourages looking
- In CVI phase 2: **color** may indicate where to look and begin **helping with discrimination**
- In CVI phase 3: **color** may help to **call attention to salient features** and details
- Use color based upon individual needs

(Phases from CVI Range: Christine Roman-Lantzy)

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Read a Book with Auditor plus Visual Supports

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Need for movement

(with the understanding and exceptions that some individuals do not see movement)

- Simple graphics
- Simple movement across screen
- Highlighting text being read

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Movement across the screen

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Latency of visual gaze

(child may see better when expecting to see something)

- Give child the control to start activity / action - when they select to start the activity, they are more likely to anticipate when to use vision
- Short sound to signal visual screen change to alert child to look (for example: page turn)
- Two switch step scanning access to allow for processing time
- Create Launchers for student to select activity

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Nothing starts immediately, individual decides to start and stop activities with consistent format

- Student can anticipate when to attend
- Student can exit activity and begin another activity as desired

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Create Individual Student Launchers

- Starting screen to access all other activities
- Student has the control

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Bradley's Kindergarten Simple Launcher

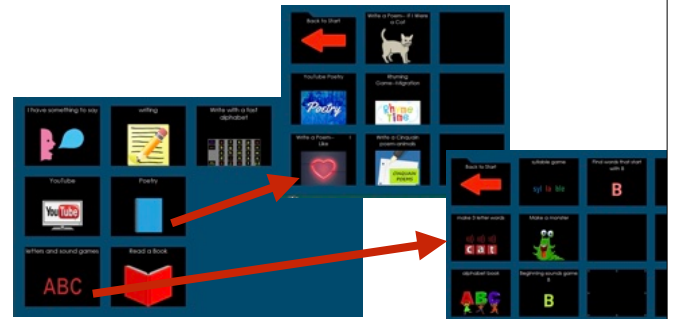
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Sophie's Preschool Simple Launcher



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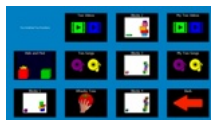
Asha Multi-Page Literacy Launcher



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Scaffolding Use of Launchers

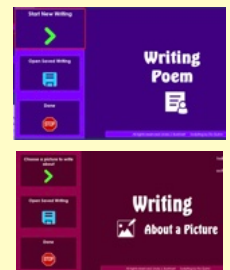
- At the early stages the partner models by selecting the activities for the individual using their switches
- This provides a scaffold for how step scanning works
- Once the individual begins using two switches, they have opportunities to explore a launcher and experiment selecting activities randomly themselves



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Difficulty with Visual Novelty

- Use templates that operate in the same or similar predictable manner when introducing new activities
- When the child is presented with a new activity, they will already be familiar with the user interface: Layout, interaction procedure, etc. They will then be able to focus on the content



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show me the text

"Pick something to do with your writing"

read

read fast

read slow

text this please

save, email, print

write another valentine



done



Story About Me
I like riding my bike. I don't like stinky trash. I wish I could play all day!
That's all
By Greg

Dear Mom,
You are the best!
You make me laugh!
Ab

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Environmental Complexity

- Competition with other senses
- Student control of starting and continuing activity and actions within activities
- Position of screen in relation to distractions in the environment

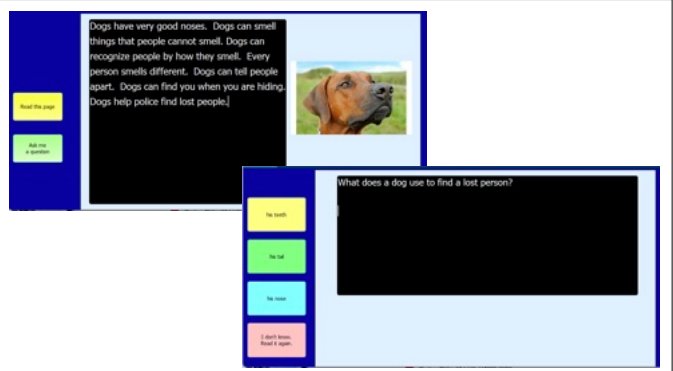


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Complexity of auditory plus visual input

- Looking and listening at the same time may be challenging
- Try short sound to alert attention and then provide visual movement without sound
- Build expectation that something will happen and then provide visual response without sound
- Turn off computer sound if helpful
- Allow for student led repetition of auditory and/or visual content (read it again) (I don't know, read it again)

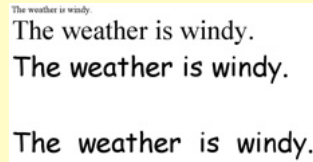
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Complexity of Visual Array

- Number of items
- Number of colors
- Number of unfamiliar items in an array
- Font (non serif vs. serif)
- Space between items



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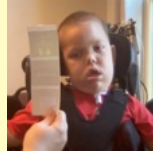
Complexity of Faces

- Use simple graphics (talking heads may be too complex)
- Understand the individual's ability to recognize faces when selecting graphics. Use graphics that elicit attention and interest (customize face pictures to the individual child)
- Provide audio descriptions and audio captioning. (Individuals may not be able to discern facial expressions that often give clues to text and assist comprehension in books)

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Complexity of visual motor

- Consider environmental placement around the switch to reduce complexity
- When using switches is still being learned, try Partner-Assisted Scanning as a no-tech strategy



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Contrast Sensitivity (Dutton)

- Acuity may be affected by specific brain damage
- Consider thickness of lines and size and boldness of text based upon individual needs
- Simplicity of images
- Contrast text on background

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Don't Overload the Visual Channel

- CVI Range (Roman-Lantzy) - determine how materials should be presented
- Reduce complexity (visual and auditory)
- Observe for visual fatigue
- Use auditory channel if vision requires too much effort or if it is not at a sufficient level on the range to introduce text

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For Some Individuals: Auditory Channel - May be the best possible option left for input and discrimination

- May be a strength
- May or may not have additional auditory processing challenges
- May be able to get some input visually, but not as reliable as auditory
- Vision may actually add complexity for some children

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Issues when the Main Gateway to the brain is Auditory:

- Bottleneck of input to the brain's working memory
 - monitoring safety in the environment (fight or flight)
 - Input needs to be auditory
 - Communication system: auditory scan
 - Switch access auditory-scan
 - Thinking is probably auditory
 - Holding a thought is challenging when needing to attend to everything through the same channel



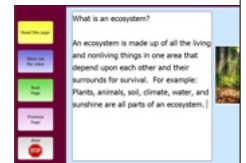
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Some Children will be Learning via a Dual Literacy Program

- Visual reading and listening comprehension skills may be at very different levels
- Can work on both at appropriate levels - in separate activities. For example: Letter identification visually and listening comprehension auditorally
- One should not hold back the other - some children can progress in both



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Activities need to provide auditory feedback

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Repetition with Moderate Differences (Variety)

- To keep interest and engagement
- Randomize lists of options
- Read with different voices

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Repetition with Moderate Differences (Variety)

- 'More Choices' options
- Leaving some operational buttons the same

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Alphabet Knowledge & Phonological Awareness

- Activities can be created to enable the student to experiment and play with letters and sounds
- Alphabet books or activities can emphasize beginning sounds
- Rhyming games can emphasize endings
- Activities can be created to focus on letters sounds and other phonemic concepts being worked upon systematically within the curriculum

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Alphabet Book

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Alphabet Knowledge & Phonological Awareness

- Activities can be created to enable the student to experiment and play with letters and sounds
- Alphabet books or activities can emphasize beginning sounds
- Rhyming games can emphasize endings

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Ear Print

- When children with CVI have unreliable access to their vision, they may need more opportunities to develop an auditory "Ear Print" that can be stored and retrieved more easily than just the visual look of a letter or word
 - The sound letter associations
 - Words spelled in a rhythm
 - Stretching and blending of letters in words

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Make 3 letter words

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Just Explore (Everything starts with B)

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Find Game (Some things start with B, some don't)

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Auditory Hook Words

(Select one hook word for each letter)

Hook Words

Apple, ask
Bye, boy, bus, bed, bad, back, ball, bug, bat, bath, bell,
Cold, Cut, Cat, Cup, Calm, Come, car, cart, cover, carry,
Dance, Dog, Dad, day, dance, dark, done, doctor, door, do
End, elephant, elevator, empty,
Fun, Fish, fast, feet, fix, fan, feel, fist, finger, family, full, farm
Good, gas, get, give, go, girl, game, gone, goofy,
Hug, hat, hand, hi, happy, hard, head, hello, help, hot, hair, hit, head,
 house, hungry, hurt
Itch, in, ill, instruments, i|
Joke, Jump, Job, jar, jelly, jacket, jeans, jewelry, jingle, joy, juice
Kiss, kick, kid, key, kitchen,
Love, laugh, leg, lip, lick, lift, like, list, look, last, lazy, lap, loud
Mad, mom, mat, math, me, mess, miss, more, move, music, mud, mouth,
 money, milk
No, not, name, nap, need, new, nice, night, nose, nut, nurse, noisy, neck, nag
Off, on

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When selecting hook words for an individual:

- Use words with the short vowel sound in the beginning of the word. For example itch rather than Ice.
- Stay away from food items for kids who don't eat much by mouth
- Stay away from things that are mostly visual for kids who have vision challenges
- Stay away from objects that don't have meaning for children who are not able to manipulate objects themselves
- Stay away from blends and double consonants at the beginning of words.

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Alex's Hook Words

Alex	No
Bye	Off
Car	PODD
Dad	Quiet
Elevator	Read
Fast	Song
Go	Talia
Hi	Up
Itch	Video
Jedi	Wait
Kick	Xray

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Play with Syllables

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Shared Reading

- This needs to be done with a live person, not independently
- Typically the student interacts using their non-electronic communication system and/or their electronic communication system.
- You can use digital books and give the individual control for turning the page, but if the child has an electronic communication pageset, then that is what the switches should be connected to, so he can comment, ask

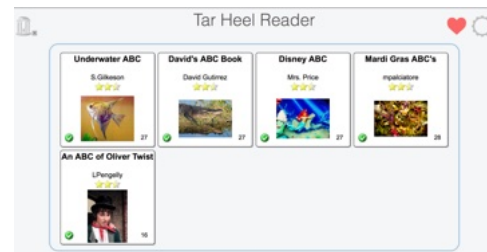
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Independent Reading

- Independent reading must be set up electronically so that the student can choose a book they want to read and when finished with that book, go back and select another one. Launchers are great for giving the individual options.
- Electronic books may be:
 - digital
 - audio recordings
 - video recordings (Read by peers, family members,

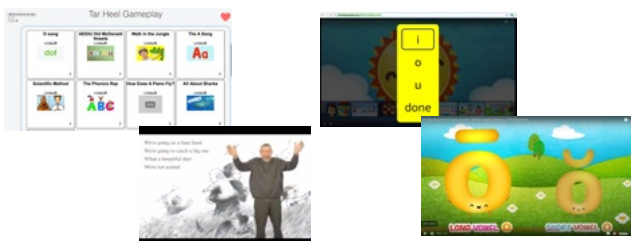
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Tarheel Reader - Use Favorites and Look for Stories that Auditorally Interesting



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<http://tarheelgameplay.org>



<https://tarheelgameplay.org/favorites/?pageColor=fff&textColor=000&voice=silent&favorites=881,897,885,883,991,849,986,901,985&fpage=1>

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Accessible YouTube

<https://www.cs.unc.edu/~gb/Accessible-YouTube/>

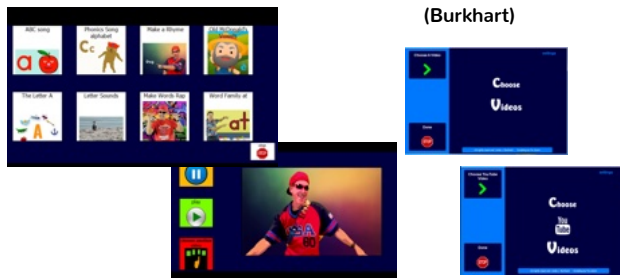
- Research
- Extension
- Explanations
- Recreation
- Partner enters search term
- Not filtered for appropriate content, but some school firewalls may prevent some videos



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Choose a Video or YouTube Video

Switch Accessible Literacy Smorgasbord Mind Express (Burkhart)

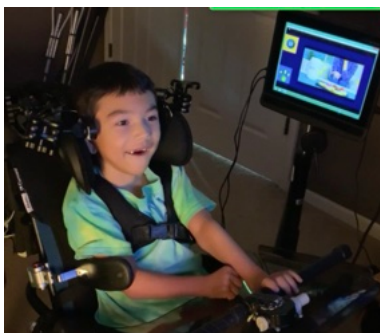


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YouTube kid books - start and stop



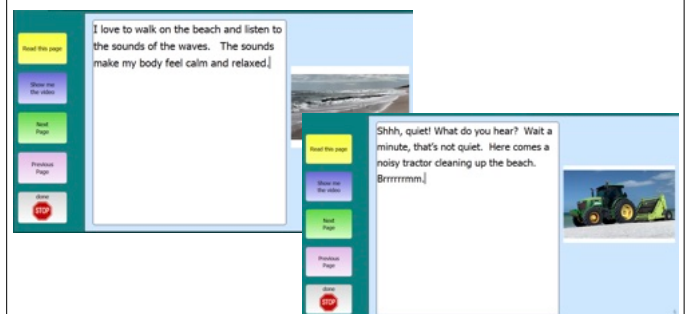
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Alisa youtube proce short green shirt

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Read a book



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Create and Read a Book

Switch On Literacy (Mind Express)
(Burkhart)

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Read a Study Guide

Ecosystems Study Guide

What is an ecosystem?
An ecosystem is made up of all the living and nonliving things in one area that depend upon each other and their surrounds for survival. For example: Plants, animals, soil, climate, water, and sunshine are all parts of an ecosystem.

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Explore books with questions and feedback - Shrinking Sean

Shrinking Sean

Sean had a problem. Every day he felt like he was shrinking. His legs were disappearing into his pants. His pants felt loose around his waist. His arms were protruding into his jacket. His ears felt funny. His arms shiver. His nose like a closed in tunnel. He didn't know what to do.

99

Writing

- Writing is one of the most appropriate blocks in which to utilize electronic tools
- Use **co-planning** to set up writing activities with the student's input
- Write for purposes that make sense and feel powerful
 - Write emails and texts
 - Write cards
 - Write poetry
 - Write lists

100

Forms of Writing

- Write with the full alphabet
- Write with AAC for someone to scribe using a non-electronic or electronic communication system
- Co-planned a limited set of words or phrases and then compose some writing those
- Use a combination of alphabet, AAC and co-planned sets

101

Write a card

Dear Mom,
You are the best!
You make me laugh!

102

Co-plan and then write emails

Dear Linda Burkhart,
I miss seeing you.
Let's Zoom **sometime**.
I miss seeing you.
I miss seeing you.
I miss seeing you.
I miss seeing you.
Love, Greg

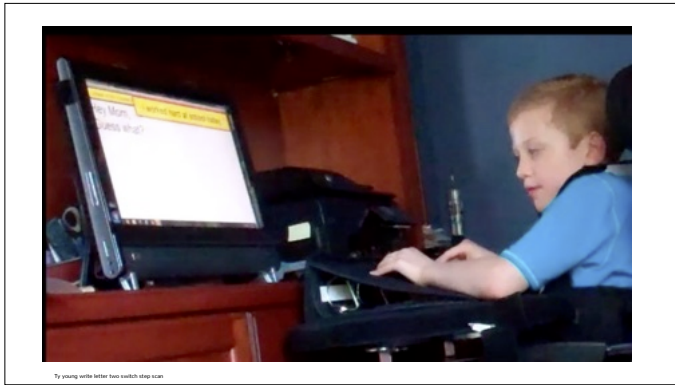
Dear Linda Burkhart,
I miss seeing you.
I think you are fun.
I wish we could get together.
What have you been up to?
I miss seeing you.
I'll tell you how I feel. I was surprised!
I miss seeing you.
I miss seeing you.
Let's Zoom sometime.
I miss seeing you.
I miss seeing you.
I miss seeing you.
I miss seeing you.
I miss seeing you.
I miss seeing you.
I miss seeing you.
I miss seeing you.
What have you been up to?
I miss seeing you.
I have a doctor visit coming up.
How are your classes going?
From, Greg

103

Co-plan and then write stories

Story About Me
I like to eat ice cream. I don't like stinky trash. When I grow up, I want to be a chef. That's all

104



105

Write with the full alphabet - simple keyboard color options

106

Write with the full alphabet - keyboard options

Auditory Scanners can not skip over things that they aren't yet ready for, so consider a more grade introduction of functions available on the keyboard

107

Write with the full alphabet - Frequency of Use order

108

Write with the full alphabet about a picture

109

Write with co-planned words/phrases A Cinquain Poem

110

Combination of alphabet and co-planning

Dogs can |

2 sentence starters

111

Co-Plan to Create a Presentation

112

Write with AAC (whole words)

Use of Robust AAC system to write and talk about writing



113

I'm asking a question,
Tell me yes or no,
meet buddy?

Writing email to Ian (friend)
Using PODD Communication book
(auditory plus visual partner-assisted scanning)
Sean age 7

114

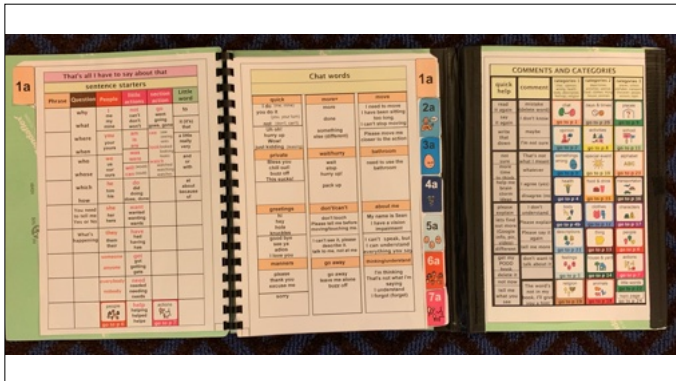
Why I think you good, great, excellent,
fantastic and cool is because I feel horrible,
strange trying hard when not here with me.

Letter to Lauren (previous assistant)
Using PODD Communication book
(auditory plus visual partner-assisted scanning)
Tom age 8

115

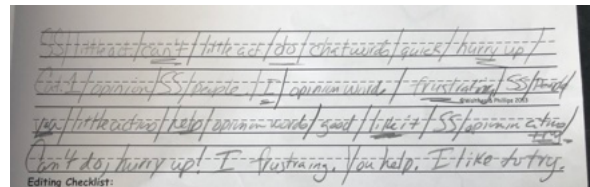


116



117

Can't do hurry up, I frustrating.
You help. I like to try.



● Annalia journal writing about topic: Write about something you are frustrated about and what you can do about it.

118

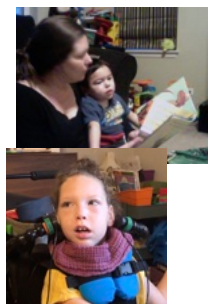
Additional Features Needed for High Tech
Wouldn't it be Great if:

- The child could listen to what is in his message window in a private ear speaker before speaking it out loud? (SGD)
 - This would allow for editing and keeping track of creating longer generative messages for speaking and writing
- All high tech Speech Generating Devices could send text to another computer for writing with the child's full language system as the full screen keyboard (A feature that is disappearing from many SGDs)

119

Remember Tools do not Teach Literacy!!!
People do!

- Electronic tools can enhance a Comprehensive Literacy Program
 - Provide a means to actively / independently explore concepts
 - Include strategic feedback to enhance learning
 - Write for real purposes!
 - Customize for specific students
 - Co-planning with the student when creating electronic activities



120