Stepping Stones to Switch Access:

Teaching Switch Access for Communication and Learning

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Speaker Disclosure

- **Linda Burkhart** is a private consultant and presents trainings around the world. In addition, she has a small home business for several books and software titles she has authored.

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Who might use switches for access to communication and learning?

- **Physical challenges**
  - **that limit direct selection through pointing**
  - **with additional visual challenges that may limit size and complexity of vocabulary on an AAC system**
  - **plus need for multiple access methods due to physical position, fatigue, environmental factors, strategic competencies, and preference**

3

There is more to using switches than getting a child to "hit the switch"

4

Going on a Switch Hunt?

5

Going on a Switch Hunt?

STOP!

6

Myth: "We just have to find the perfect switch placement."

7

Reality: We have to find some good possible switch placements and provide opportunities for the child to learn how to use them.

8

Its Not About Finding the "Perfect Switch Site"

Its About Finding the Best Switch Sites to Learn to Use

9

No One Starts with Automaticity of Movement

Motor Skills are Learned

10

Learning is impacted by:

*the ability to perceive differences

*make sense out of the nonsense

(Anat Baniel)

11

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

12

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

13

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
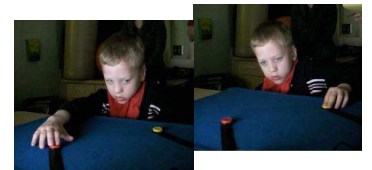 - Learn to move in a healthy pattern

14

Using two switches <u>without timing</u> is frequently easier and leads to development of more controlled refined movements than using one switch <u>with timing</u> demands

15

Teaching Switch Access

- Before being able to use switches for learning, individuals need to develop automaticity for switch use
- Learning to use a switch to the point of automaticity for access is a process

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Automaticity is a Level of Skill Where You No Longer Have to Consciously Think About Performing that Skill
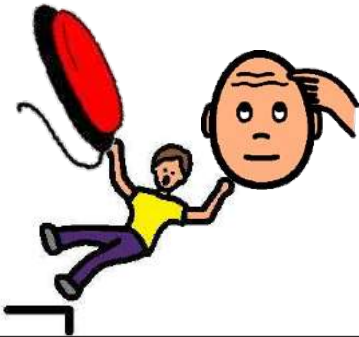

17

The Juggling Act and Working Memory

18

Always Balance Cognitive and Motor Difficulty

19

Juggling Explains Inconsistency of Performance

20

Parallel learning for development of autonomous, independent communication

21

Parallel Learning!

Team plans long term direction and works on skills in parallel

22

Focus on one component or skill within each activity, or part of activity

- Reduce motor load for difficult cognitive, language and academic tasks
- Reduce cognitive load for motor learning tasks
- Teach switch access as a separate but parallel skill to language and academic learning

23

"Non-Electronic" partner-assisted scanning Communication Book for Communication

- Reduce motor load
- Reduce vision load if needed

24

Non-Electronic Academic Modifications

Writing with the Alphabet "adapted pencil"

Testing adaptations

Subtraction			
9	-	4	=
7	-	5	=
8	-	7	=
9	-	2	=
6	-	5	=
8	-	1	=

Reduced quantity of work

Alex model alt pencil cat start

25

Develop Motor Control and Active Positioning

- Reduce cognitive load
- Reduce language load
- Reduce vision load if needed

26

Switch Play to Develop Motor Skills for Switch Access

- Reduce cognitive load
- Reduce language load
- Reduce vision load if needed

27

Vision Development for CVI

- CVI Range (Roman-Lantzy)
- Appropriate adaptations
- Reduce motor, cognitive, and language demands
- May or may not work on vision during communication or when focused on motor learning

28

Eventually: Combine Motor, Language, Academic and Vision Skills to Operate a Communication Device and Technology for Learning

29

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

30

Why Hand-Over-Hand is not as effective as Self-Directed Exploration

Ke Z, Yip SP, Li L, Zheng X-X, Tong K-Y (2011) The Effects of Voluntary, Involuntary, and Forced Exercises on Brain-Derived Neurotrophic Factor and Motor Function Recovery: A Rat Brain Ischemia Model

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

32

Motivation Provides Intent

33

Natural Context Provides Purpose and Variation

34

Empty praise is NOT helpful

May make it hard to perceive differences

35

Who Likes to be Told What to Do?

What do we do to kids all day long?

36

Who Likes to be Told What to Do?

Limit telling the child what to do

37

Provide Strategic Feedback instead of Direct Prompts

38

Feedback is Critical to Motor Learning

- Appropriate and perceived feedback
- Immediate
- Develop a neurological loop (intent to action)
- Be strategic and clear with feedback
- Sometimes be quiet and let the child problem-solve with the switches

39

Don't Build an External Prompt into the Motor Loop

40

The Power of Modeling! Take a Turn – Instead of Prompting

Teach Peers to Model

41

Stability and Active Position Important Components

- Active weight bearing on pelvis
- Moving forward slightly
- Learning to actively rotate and/or shift weight - even if only slightly
- Grasp bar (teach child to actively desire and participate in stabilizing and moving themselves)
- Control often begins at the head when body is <u>actively engaged with gravity</u>

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Proximity (sensor) Switches can respond to subtle movements without extra force applied to activate them

ROUND PROXIMITY SENSOR - DUAL

Adaptive Switch Labs

HoneyBee

Candy Corn

43

Proximity Switches and Splashtop or TeamViewer

Switches are connected to the computer And displayed on iPad

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

45

Step 1: Single Switch: Cause and Effect

Child begins to associate an intentional movement with the ability to cause something to happen

46

Begin with Accidental Switch Activation

Working on Cognitive Part not the "Correct" movement

47

Cause and Effect Learning vs Recreation and Leisure

Momentary / Direct / Short vs Longer Entertainment

48

Mind Express
Steps Before Step Scanning
Cause Effect Direct
(Burkhart)

www.star-at.com

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Step 1: Single Switch:
Cause and Effect
Technology Features: Immediate response to effect, momentary or direct effect (plays and stops concurrently with switch activation and release), or short effect (plays only 1-6 seconds upon switch activation)
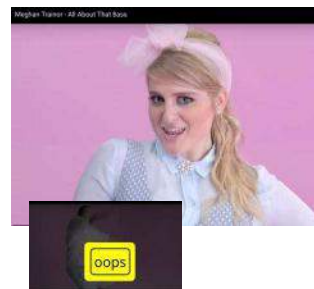
50

Rad Sounds
(RJ Cooper)

Switch Accessible
Boombox

Switch Accessible Boombox
& Step Scanning App
(Judy Lynn)

51

tarheelgameplay.org
Basic Cause and Effect

https://tarheelgameplay.org/2017/07/13/meghan-trainor-simple/

https://tarheelgameplay.org/2016/11/17/meghan-trainor-all-about-that-bass/

https://tarheelgameplay.org/2017/05/11/cant-stop-the-feeling-justin-timberlake-2/   https://tarheelgameplay.org/2017/05/05/bad-good-ugly-theme/

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Downloading Videos
(sites and Apps are always changing)

- On computer: YTmp3.cc

YTMP3

Please insert a valid video URL

- On iPad: iCab App

iCab Mobile (Web Browser)
Alexander Clauss

Tutorial for iCap App:
https://drive.google.com/open?id=1zr-xuc5AFWXCCYFLV3rMu7ZN5tmVjacz

- For creating animated gifs from videos: EZGIF.com

EZGIF.COM
ANIMATED GIFS MADE EASY

53

Step 2: Single Switch:
Multiple Locations
Multiple Functions

Child understands simple cause and effect but needs practice intending and executing a movement for different purposes or locations

54

Single Switch - Multiple Locations

- Create little problems to solve to work out what does this do? How can I use it?
- Try different switch sites - beginning with direct or momentary activation
- Not to find "perfect" switch site, but find possible sites to learn to use

55

Step 2: Single Switch:
Multiple Locations / Multiple Functions

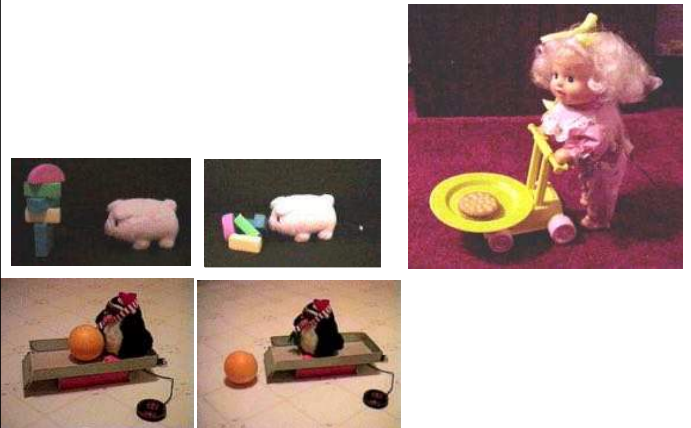**Technology Features:** Immediate response for short effect upon switch activation

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Single Switch - Multiple Functions

Battery Operated Devices with a Purpose or Function!

57

Give Switch Toys a Purpose

58

Expanding Possibilities

59

Co-Planned Sequenced Social Scripts

Burkhart and Musselwhite

60

Gotalk Now Plus
Co-Planned Sequenced
Social Script Template

https://drive.google.com/open?id=18YvNO7lc8oR6LGFYbXPA2HnxPJcHEueQ

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Spinner Games

62

Use Recipes (Accessibility) on iPad to assign a gesture such as spinning to a switch

Spin the Bottle (original) App

63

Free PowerPoint Spinner adapted by Fio Quinn

http://bit.ly/2DOIEUD

64

Hats, Blocks, Who is Hiding
Steps Before Step Scanning
(Burkhart)

65

Let the child explore and provide strategic feedback

Annalia 1 switch left shorter

66

Step 3:
Two Switches / Two Functions

Discrimination and Problem Solving

67

Step 3: Two Switches
Two Functions

Technology Features: Immediate effect for switch activation. **Second switch interrupts first effect.**

68

Move to two switches two functions as quickly as possible

Increase Cognitive Engagement

69

A Reason to Problem-Solve

"Throw it to me!"

Make the Penguin kick the ball
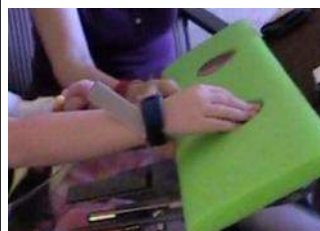
 Build it up!

Make the Pig knock down the blocks

70

Try Smaller Switches

Increase focus and discrimination

71

Recessed and/or Angled Switches

72

Loc-Line Switch Mount
Easily adjust position of switches
Modularhose.com

73

Super Switch Hitter and Switch Jam
Marblesoft/Switch in Time

74

Mind Express
Steps Before Step Scanning:
Two Switches (Burkhart)

www.star-at.com

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Building Blocks

Alex chair 2 switches arm blocks
Alex U blocks fix head shorter

76

Inclusive Technology
Switch Skills for 2 - Set 1

also some on helpkidzlearn.com

77

Judy Lynn: Learning Two
Switch Step Scanning
& Step Scanning App

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Switch Applicator

- Inclusive TLC
- Programmable and Music Modes

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Types of Scanning

- Automatic Scanning
- Inverse Scanning
- Step Scanning with a Delay
- 2 Switch Step Scanning

80

Why Two Switch Step Scanning? vs. Automatic/Timed Scanning?

81

Eliminate Timing
(Timing requires automaticity)

You need to slow down to learn the graded movement

82

Active vs. Passive

83

Scan does not move if attention shifts or wanders

- Requires less demand on concentration
- Allows for for possible distractions
- Encourages appropriate social pragmatics to relate to others who might talk to them during the scanning

84

Two Switch Step Scanning: Allows Child to Pace his Own Processing Time

Child is in control of the timing

Once automaticity is achieved, then some individuals move to timed scanning and some continue to use step scanning

85

Fatigue

Step Scanning

- May be more physically fatiguing
- Provides multiple opportunities to practice switch use and develop motor control
- May help to develop endurance when learning to use switches

Timed Scanning

- May be more cognitively fatiguing
- Need to maintain focus
- Less physical fatigue - especially for degenerative disabilities

86

Some Kids Just "Get it" Other Kids Need to Learn it

Kids who understand the concept of Step Scanning, skip Stepping Stone #4 and move on to Stepping Stone #5

87

Stepping Stone 4: Learning to Two Switch Step Scan: Move, Move, Get

- For children who do not understand how step scanning works (some children may skip this step)
- For children who need more practice with both switches with a purpose
  - One switch becomes a "mover"
  - Second switch becomes a "getter"

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Step 4: Move, Move Get or Learning to Two Switch Step Scan

<u>Technology Features:</u> Two switches but only one switch is active at a time. Switch 1 moves an item along a path. Switch 2 is not active. Each switch activation moves the item closer to the end of the path. Once the item arrives at destination, the first switch ignores the input while the second switch becomes active and selects the item at the end of the path.
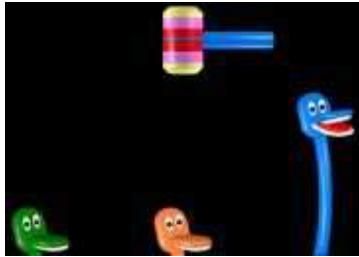
89

Delay timer set to 1-2 seconds for mover switch

90

Learning Two Switch Step Scanning - Lesson 4 & Step Scanning App (Judy Lynn)

91

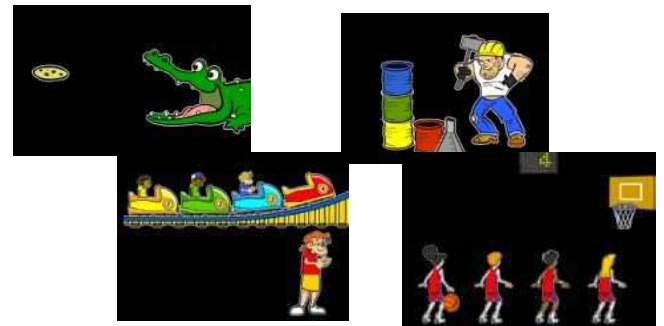## Mind Express Steps Before Step Scanning (Burkhart)

92

Annalia move get vehicle snow plow video

93

Switch Skills for Two Set 2 (Inclusive TLC)
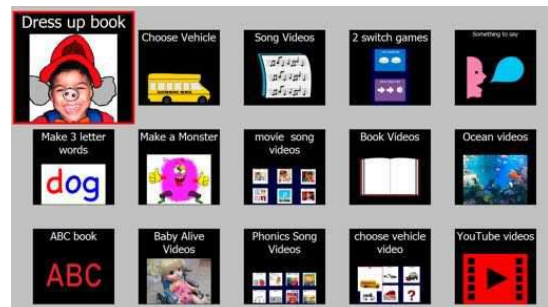

also some on helpkidzlearn.com

94

Step 5: Two Switch Step Scan - Failure Free

Create using: Classroom Suite, Mind Express, Clicker, Boardmaker Plus, Boardmaker Studio, Communicator, GoTalk Now, Grid, Compass, Whatever software/app you might have access to, etc.

95

No "Right" or "Wrong" Answers - Just a "Playground" to Explore with Good Strategic Feedback for the Child's Selections

96

CAUTION:
Some People Have Redefined
"Errorless Learning"

We are now using:
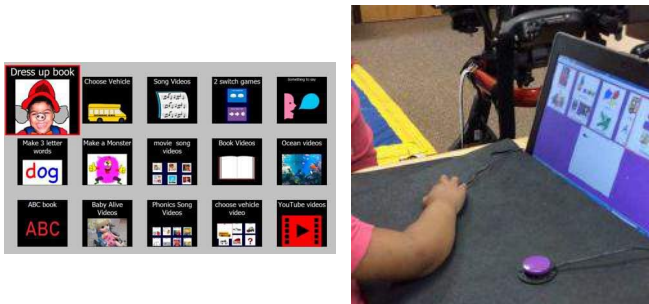"Failure Free with Feedback"
(Karen Erickson)

97

Step 5: Two Switch Step Scanning - Failure Free with Feedback

Technology Features: Scanning does not begin until the individual activates switch 1. Activation of the first switch immediately interrupts any sound, animation or auditory cue and highlights the next item in the array. Switch must be released and reactivated to move to the next item. The second switch selects the highlighted item. Launcher features highly desired.

98

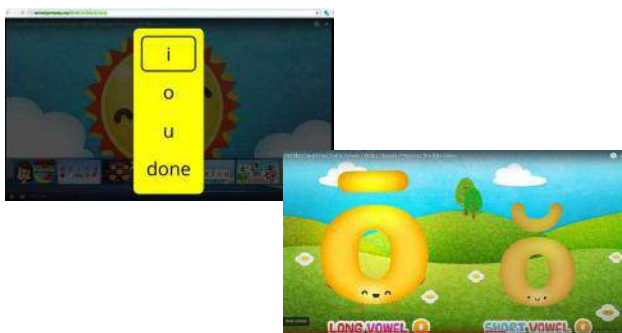Launchers provide individuals with control and foster Problem Solving

99

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

100

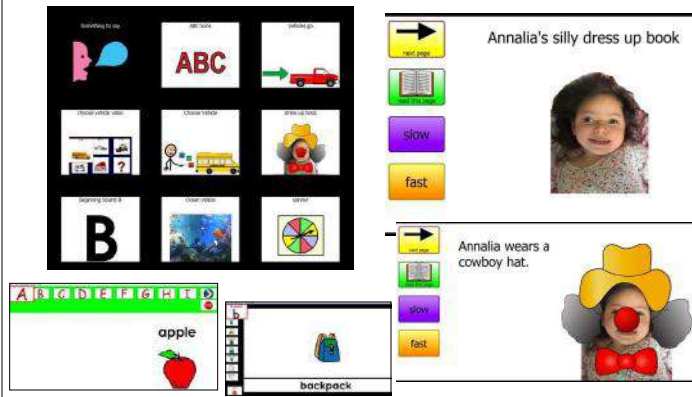tarheelgameplay.org/ 2016/11/16/a-e-i-o-u/

101

Individual Student Launcher (Mind Express)

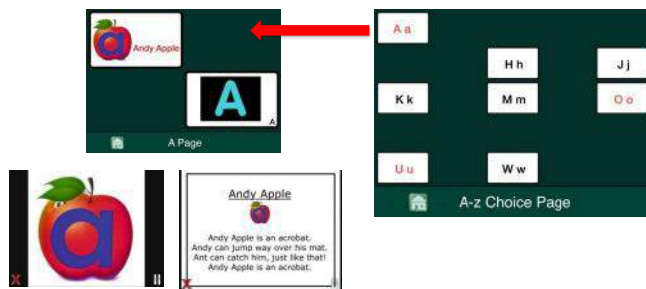
102

Failure Free With Feedback Mind Express (Burkhart)
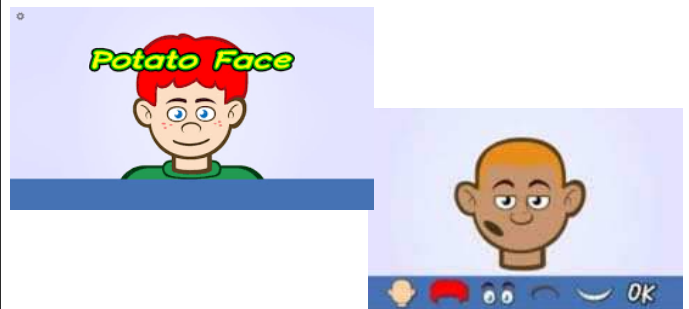
103

Scan and Paint (Judy Lynn)

104

GoTalk Now Plus Alphabet Play Book

https://drive.google.com/open?id=1f_eUAXrUdUSeWbv0lb5GQq6j3pKPvAEN
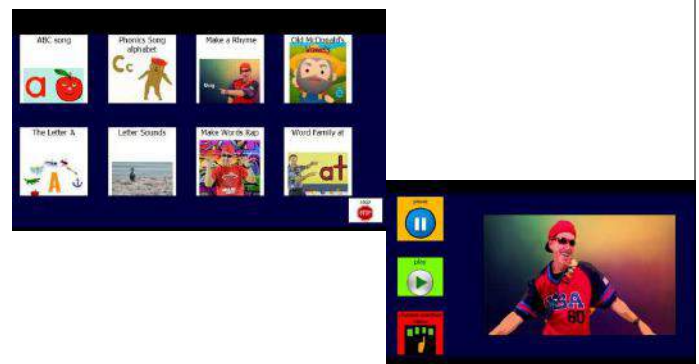
105

Potato Face (Marblesoft)

106

Choose a Video (Grid 3)

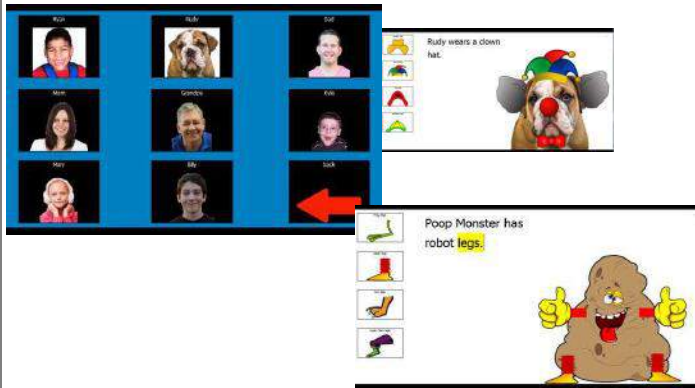https://drive.google.com/open?id=1H9r2Qno6WAPKbXbQsL2_E5sZBM-tgAwj
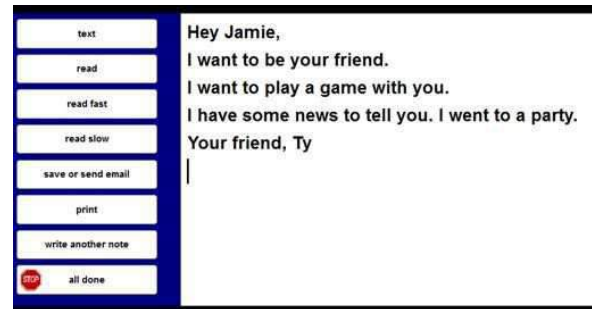
107

Choose a Video (Mind Express)
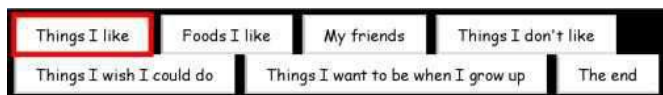
108

Dress Up Book & Make a Monster

Rudy wears a clown hat.

Poop Monster has robot legs.

109

Failure Free Writing Notes (Mind Express)

| text |
| read |
| read fast |
| read slow |
| save or send email |
| print |
| write another note |
| STOP all done |

Hey Jamie,
I want to be your friend.
I want to play a game with you.
I have some news to tell you. I went to a party.
Your friend, Ty

110

Co-Planned Failure Free Writing

| Things I like | Foods I like | My friends | Things I don't like |
| Things I wish I could do | Things I want to be when I grow up | The end |

My Story

I like riding my bike.
I like to eat ice cream.
I don't like stinky trash.

111

Failure Free Writing Notes (Clicker 7)

download

Dear Dad,

Something I want to tell you. | Something I want to do with you. | Something I want to ask you.
I'll tell you what I think. | I have some news to tell you. | Something about me
sign my note

Dear Dad,

I want to be your friend. | I think you are nice. | You make me laugh.
I like you. | I love you. | type something to tell.
none of those

112

Make 3 Letter Words (Mind Express)

| b |
| c |
| d |
| f |
| h |
| m |
| r |
| s |
| STOP |

ad
id
og

d

dad

d ad

dad

113

Step 6: Two Switch Step Scan for Clear Choices:

Activities for Increasing Accuracy and Cognitive Engagement - Moving to a specific target in an array

I work on the computer with Pat.

114

Leave some blanks in the array, to encourage selection of one targeted item

- Only do this with individuals who have had lots of experience with failure free step scanning
- Trying to teach child to select a specified target too soon in the process may discourage internal motivation

click click click to read

Clang, clang, clang!
Beep, beep!
Zoom, zoom zoom!

115

Step 6: Two Switch Step Scan for Clear Choices:

Technology Features:

Same as step 5 plus ability to have some cells scanned with only a sound or 'nope', 'more', etc. and then have a big effect for target selection: video, song, animation, etc.
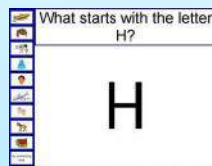
116

Step 7: Practice for Increasing Accuracy with Two Switch Step Scanning

Some activities have correct and incorrect options, but also have good feedback for incorrect items
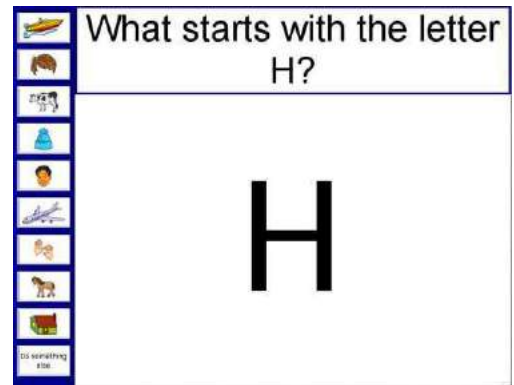
What starts with the letter H?

H

Simple Powerful Page Set

117

Some activities have correct and incorrect options, but also have good feedback for incorrect items

What starts with the letter H?

H

Do something else

118

Partner-Assisted Scanning with iPad Apps

Pipe Cleaner Pointers

- Won't activate screen
- Clarifies what is being scanned
- Helps focus visual attention
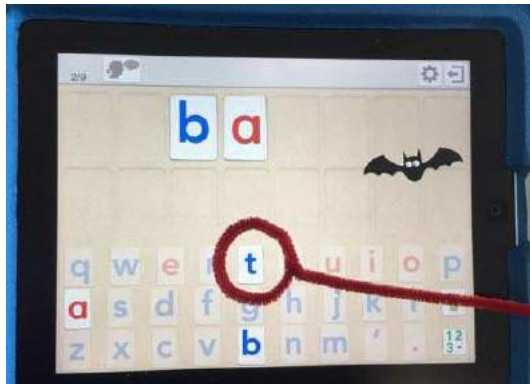- Child selects with yes/no head movements or 2 voice-output switches

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120

Partner Assisted Scanning on Apps - Word Wizard

121

Step 7: Practice for Increasing Accuracy with Two Switch Step Scanning

Technology Features:
Same as step 5 plus more specific content with clear feedback. Different selections have very different results.

122

Listening Comprehension with Feedback (Mind Express)

123

Step 8: Automaticity Two Switch Step Scan Reducing Time for Success
The child has now developed automaticity with switch access and they can focus on content and not just on activating the switches (Now, some individuals will be able to use automatic scanning)
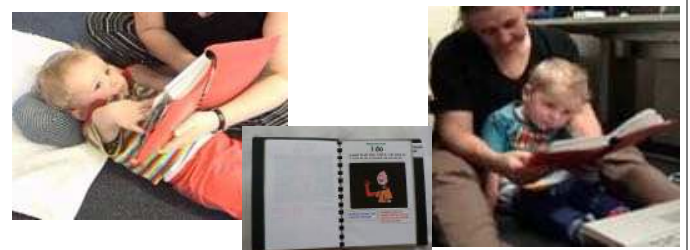

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PODD

JAMES

Dynamic Assessment and Intervention

Gayle Porter - CPEC (Cerebral Palsy Education Center)

125

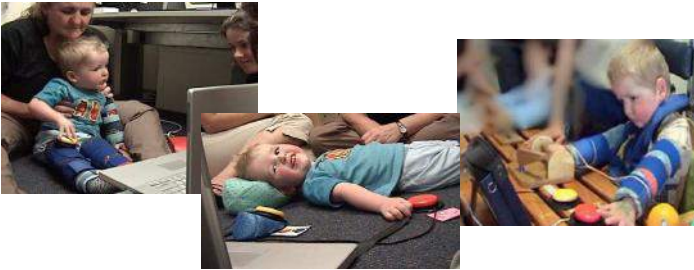## One per page PODD communication book Learned to use yes/no head movements for partner-assisted scanning

Auditory Plus Visual Partner-Assisted Scanning - Item by Item

James Gayle want play 2

126

One Switch, then Two Switches Multiple Functions

James Gayle balloons sm file

Play activities to develop switch skills - computer as well as remote controlled toys at home

127

12 Expanded Functions PODD communication book with pull-off columns (group/item) Auditory Plus Visual Scanning

128

Simple, Powerful page set on SGD (Speech Generating Device)

- **Similar vocabulary organization to his non-electronic communication book**
- **Most powerful (personally relevant) messages to say out loud**
- **A way to access his communication book**

129

SGD using 2 switches - time to babble and explore language

james first dynavox export

130

Robust Language Page Set SGD and Robust Language in Communication Book

- **Opportunities to generate novel messages to meaningfully communicate across the day**

(His choice to use SGD or Book as desired in different contexts)

James hand 2010

131

Explored head switches to expand his options with robust PODD communication page set
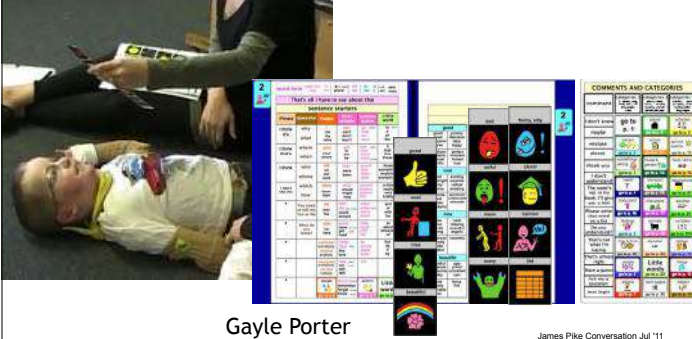

Uses every day to speak and write

JAmes DYnaVox head switch july 10

132

Also uses increasingly complex language in his auditory plus visual scanning PODD book according to his preference, fatigue, context and position

Gayle Porter

James Pike Conversation Jul '11

133

Thanks!

I would like to personally thank all the individuals and their families for teaching me so much and also for generously allowing me to use photos and videos

Handout:

www.LBurkhart.com

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