Stepping Stones to Switch Access:
Teaching Switch Access for Communication and Learning
Linda Burkhart   www.Lburkhart.com

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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

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

4

Going on a Switch Hunt?

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Going on a Switch Hunt?

STOP!

6

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

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

Its Not About Finding the "Perfect Switch Site"

Its About Finding the Best Switch Sites to Learn to Use

No One Starts with Automaticity of Movement

Motor Skills are Learned

Learning is impacted by:

*the ability to perceive differences

*make sense out of the nonsense

(Anat Baniel)

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

You cannot 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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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

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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

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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
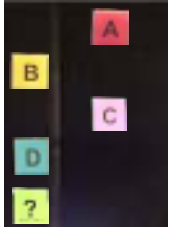- Teach switch access as a separate but parallel skill to language and academic learning

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"Non-Electronic" partner-assisted scanning Communication Book for Communication
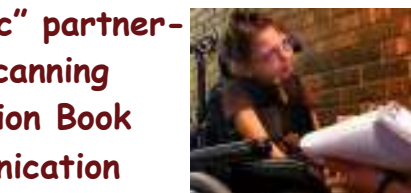
- Reduce motor load
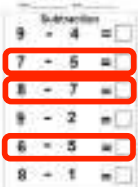- Reduce vision load if needed

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Non-Electronic Academic Modifications

Testing adaptations

Reduced quantity of work

Alex model alt pencil cat start

Writing with the Alphabet "adapted pencil"

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Develop Motor Control and Active Positioning

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

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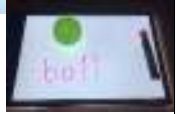## Switch Play to Develop Motor Skills for Switch Access

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

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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

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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

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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

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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

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Provide Strategic Feedback instead of Direct Prompts

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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
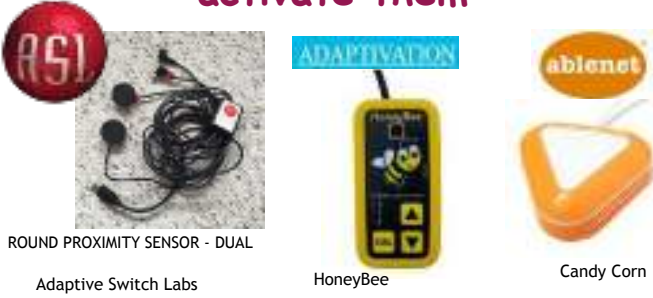
43

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
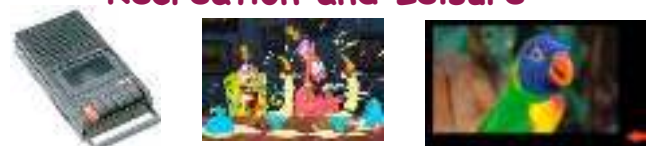
46

Begin with Accidental Switch Activation

Working on Cognitive Part not the "Correct" movement

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Cause and Effect Learning vs Recreation and Leisure

Momentary / Direct / Short vs Longer Entertainment

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

www.star-at.com

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)

Rad Sounds
(RJ Cooper)

Switch Accessible Boombox
& Step Scanning App
(Judy Lynn)

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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/

Downloading Videos
(sites and Apps are always changing)

- On computer: YTmp3.cc

- On iPad: iCab App

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

- For creating animated gifs
  from videos: EZGIF.com

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

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

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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

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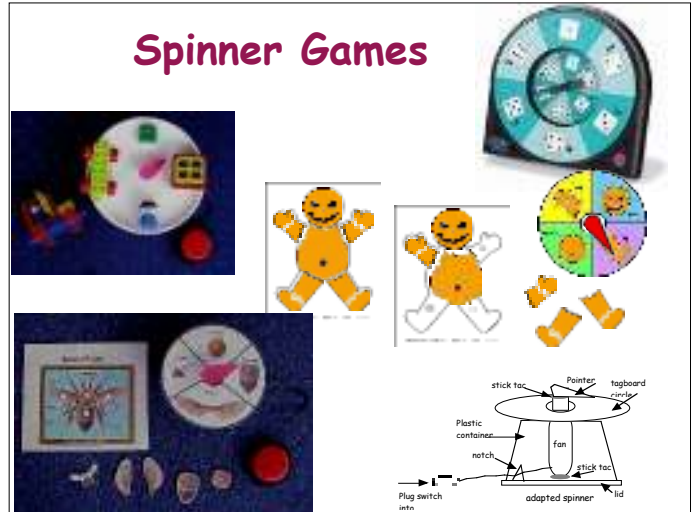## Co-Planned Sequenced Social Scripts

Burkhart and Musselwhite

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Gotalk Now Plus
Co-Planned Sequenced
Social Script Template

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

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Spinner Games

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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

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Step 3: Two Switches
Two Functions

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

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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 Switches

72

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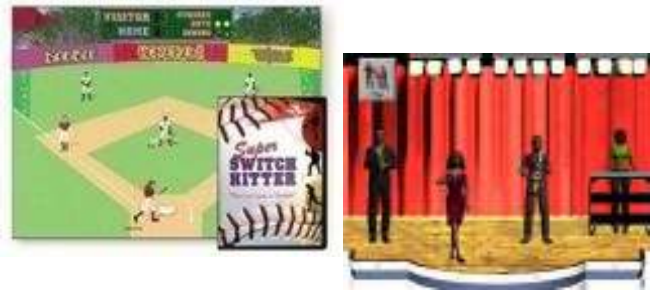### Easily adjust position of switches
Modularhose.com

Super Switch Hitter and Switch Jam
Marblesoft/Switch in Time

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

www.star-at.com

Building Blocks

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

Inclusive Technology
Switch Skills for 2 - Set 1

also some on helpkidzlearn.com

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

Switch Applicator

- Inclusive TLC
- Programmable and Music Modes

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Types of Scanning

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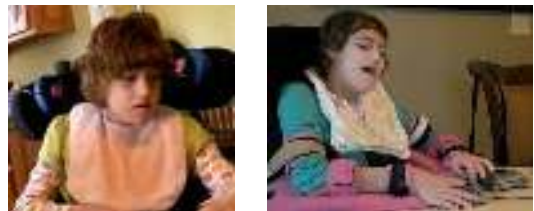- 2 Switch Step Scanning

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

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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

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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

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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

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"

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

Technology Features: 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.

Learning Two Switch Step Scanning - Lesson 4 & Step Scanning App (Judy Lynn)
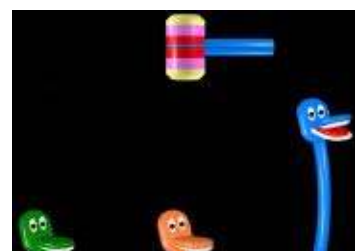
Mind Express
Steps Before Step Scanning
(Burkhart)

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Annalia move get vehicle snow plow video

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Switch Skills for Two
Set 2 (Inclusive TLC)

also some on helpkidzlearn.com

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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.

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

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CAUTION:
Some People Have Redefined
~~"Errorless Learning"~~

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

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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.

97

Launchers provide individuals with control and foster Problem Solving

98

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
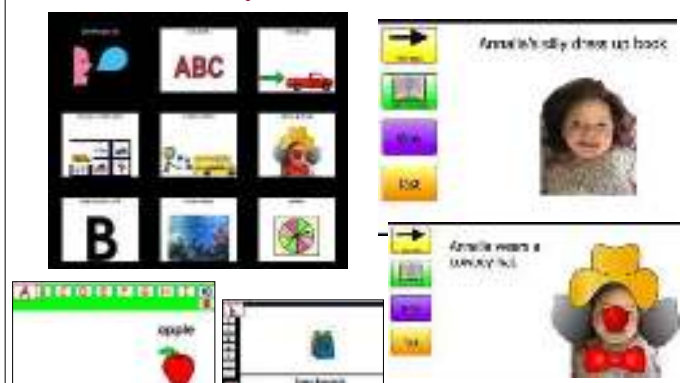
99

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

100

Individual Student Launcher (Mind Express)

101

Failure Free With Feedback Mind Express (Burkhart)

102

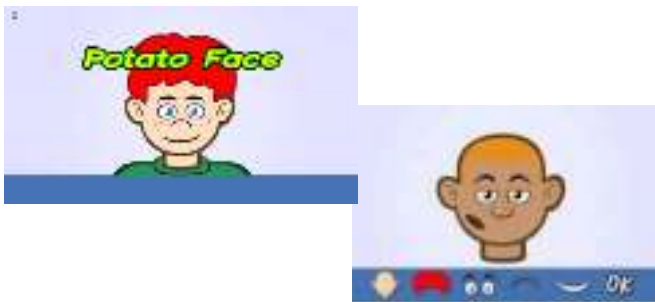## Scan and Paint
(Judy Lynn)

103

GoTalk Now Plus
Alphabet Play Book

104

Potato Face
(Marblesoft)

105

Choose a Video
(Mind Express)
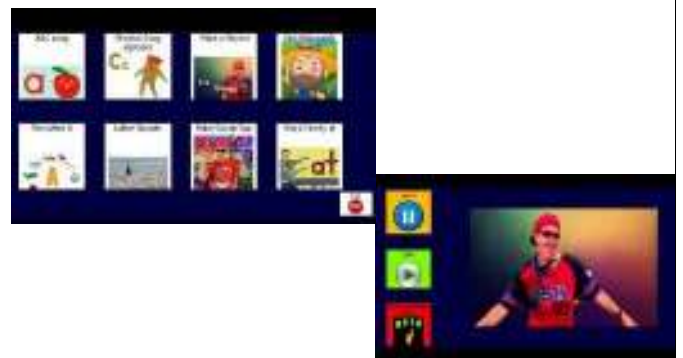
106

Choose a Video
(Grid 3)

107

Dress Up Book &
Make a Monster

108

Failure Free Writing Notes (Mind Express)

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

109

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.

110

Failure Free Writing Notes (Clicker 7)

download

111

Make 3 Letter Words (Mind Express)

dad

112

Step 6: Two Switch Step Scan for Clear Choices:

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

113

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**

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

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## 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.

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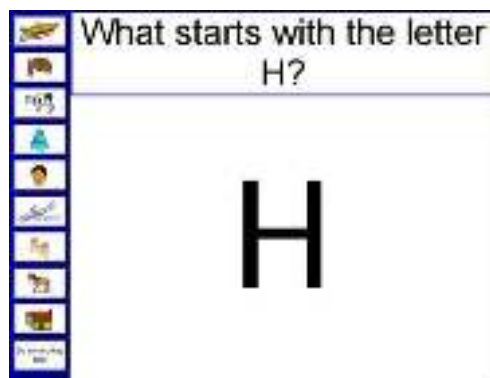## Step 7: Practice for Increasing Accuracy with Two Switch Step Scanning

Some activities have correct and incorrect options, but also have good feedback for incorrect items
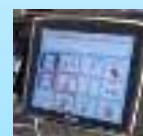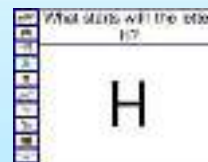
Simple Powerful Page Set

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

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Partner-Assisted Scanning with iPad Apps

Pipe Cleaner Pointers

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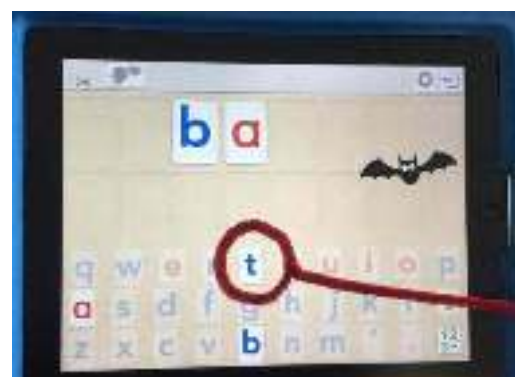- Child selects with yes/no head movements or 2 voice-output switches

118

119

Partner Assisted Scanning on Apps - Word Wizard

120

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.

121

Listening Comprehension with Feedback (Mind Express)

122

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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HANDOUT

www.LBurkhart.com

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