Success with Switches: Balancing the Task and Technology

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Introductions & Background

- **Jessica Caron, M.S. CCC-SLP**
  - Speech Language Pathologist at the Augmentative Communication Program at Boston Children's Hospital
  - Work includes: diagnostic evaluations and therapy session both in the clinic and in schools
- **Jennifer C. Buxton, MA, OTR/L, ATP**
  - Assistive Technology Specialist at Augmentative Communication Program at Boston Children's Hospital
  - AT Consulting to schools thru OT & SLP private practice, Assistive Technology Partners
  - Lecturer Tufts University, graduate course in Assistive Technology to OT & engineering students
- **Lindsay Rice, M.Ed., Ed.S.**
  - Special Education Teacher
  - Special Education Administrator, LABBB Collaborative, MA

Handout Will Be Available at....

- http://www.childrenshospital.org/acp

Learning Objectives

- Participants will identify at least 5 variables that impact successful switch scanning
- Participants will be able to describe three types of opportunities that should be presented daily to a switch scanner
- Participants will be able to list three modifications to balance the relationship between the "task" and the "technology"

Setting the Stage

Setting the Stage

Alternative access is important because many of the people using communication devices have limited mobility and cannot direct select with their fingers or toes.

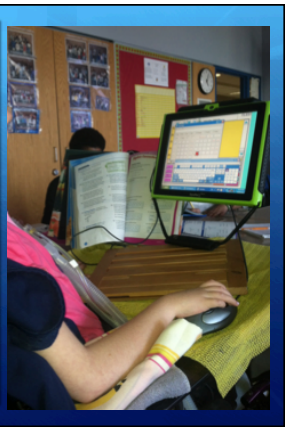
Scanning switches have been around for decades and will be for decades to come because they represent an effective means of alternative access for some users with physical impairments.

(Beukelman & Mirenda, 2005)

Setting the Stage

Scanning is where the items in the selection set are presented sequentially over time and the user makes a selection indirectly, typically via one or two switches.

This is in contrast to direct selection where all items in the selection set are available at the same time and the user goes straight for the one he/she wants



Setting the Stage

During the assessment process many factors are identified:

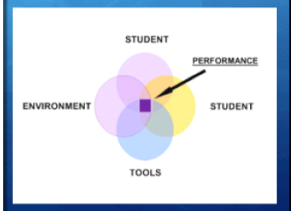
- Switch placement (control site)
- Switch type (mechanical, pneumatic, sensor)
- Tone, cognitive level and motor control
- Motor movement agreed upon for on, off, and wait
- Types of technology Technology and scan settings

SETT Framework

SETT = Student, Environment, Tasks and Tools

Originally developed by Joy Zabala (Zabala, 1995).

The SETT Framework is used as a tool to help collaborative teams gather and organize information so that the teams can correctly identify problems and seek effective solutions.



SETT Framework

The SETT framework provides a way to build group knowledge about the Student, the student's customary Environments, the Tasks the student must complete to be a more active participant in those environments, and finally, the Tools required to support the student in achieving the tasks

http://www.wati.org/content/supports/free/pdf/form/ReferralGuide-Form.pdf

http://www.wati.org/content/supports/free/pdf/WATI%20Assessment.pdf

The SETT Framework
For Considering Assistive Technology

S Student	
E Environment	
T Tasks	
T Tools	

Observations of Switch Scanning Sessions

General Observations: Sessions Commonly Include

- LIMITED TO NO modeling
- Increased demands put on student (high cognitive demands, motor demands and language demands all at once)
- Activities are set up in a way that the student is constantly being tested
- Activities have a greater chance of technical errors (e.g. not scan correctly)
- The feedback/settings are not changed or modified per task (e.g. auditory preview or changing scan rate during certain tasks)
- Clinical reasoning not applied when student is not performing

Video

- Observe balance between technology and task
- Observe how task became a "yes/no" instead of focusing on vocabulary we were teaching
- Observe the number of times the clinician models using switches or the device

Same Vs. Different Lesson Examples of Changes to Make!

1. Errorless:
   Robert and Clinician says Same or Different on his device multiple times. The clinician then manipulates the icons on the Smartboard to reflect the chosen core word
2. Independent:
   Robert will use the words Same and Different (on Control words page- all other options will not scan) to tell clinician if he wants to watch the same video clip or a different one
3. Supported
   Robert will scan into the Control Categories (with all items scanning on the page) to make a comment/direct activity to the prompt "Do you want to hear the same song or a different song?" When needed, navigational supports and physical prompts will be provided.

Why does switch scanning fail?

For Individual it is Harder
- Cognitively process demand/goal of activity
- Identify correct response
- Wait for auditory prompt or visual stimulus
- Process need to send signals to produce motor response in a timely fashion to activate switch
- Repeat…Repeat…Repeat
- Decreased efficiency

For a professional it is harder
- More parameters to consider in each activity
  - Cognitive load required
  - Scanning time
  - Layout
  - Scan Pattern
  - Need to customize all available resources for individual scanner
  - Other Settings: color contrast, magnifies, making wrong selection behavior, forced order, send behavior

Why does switch scanning fail?

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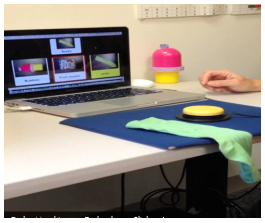
- Process needed to send signals to produce motor response in a timely fashion to activate switch
- Repeat…Repeat…Repeat
- Decreased efficiency
- Management of Motor Cognition and other systems at once



Why does switch scanning fail?

For a professional it is harder
- More parameters to consider in each activity
  - What tools will help meet the task
  - Understanding task demands
  - Scanning time
  - Layout
  - Scan Pattern
  - Need to customize all available resources for individual scanner
  - Other Settings: color contrast, magnifies, making wrong selection behavior, forced order, send behavior

Agenda

1. Awareness to key areas to consider when creating academic and communication supports for switch scanners.
2. Review three different types of opportunities that should be provided to students
3. Case studies, videos, screen shots and images.

1. Awareness to key areas to consider when creating academic and communication supports for switch scanners.

- Goal of the task
- Layout / Design (# of distractors, level of difficulty of distractors, number of icons, word level, photo / symbol level)
- Switch and Activity Settings
- Feedback (auditory preview, digitized vs synthesized voice, positive/negative response behaviors)
- Intrinsic Enablers (students motivation, frustration level, interest in the task/content)
- Type of motor day / Level of scanner: motor skill performance

2. Review three different types of opportunities that should be provided to students

Each day a switch scanner should be provided with opportunities to:

Engage in **errorless manner and a judgment free time**

Engage in **independent participation**

Engage in **supported participation**

3. Case studies, videos, screen shots and images.

- We will showcase how we modify these considerations for each type of opportunity we are providing.

Agenda Item #1: Balancing Task & Technology

Major Factors in the Balancing Act

- Feedback
  - Auditory preview synthesized
  - Auditory preview digitized
  - Highlight/Magnify
  - Outline/Frame
  - Speak upon selection
  - Negative/Positive Reinforcements for selections
  - "Click"

Major Factors in the Balancing Act

- Customization of Scanning Settings
  - Timing
  - Repeat
  - Color
  - Pattern (Auto, linear, latched)
  - Release time
  - Selection to start scan

B- Scan Rate and Feedback

Major Factors in the Balancing Act

- Layout
  - Number of icons (field size)
  - Size of icons
  - Arrangement of icons (horizontal, 4 corners)
  - Iconicity (symbol, photo, text)
  - Color (high contrast, highlighting of correct responses)

Major Factors in the Balancing Act

- Task
  - Preview
  - Review
  - Novel
  - More "Test" driven

Agenda Item #2
3 Types of Participation

Errorless, Independent and Supported

Errorless Participation

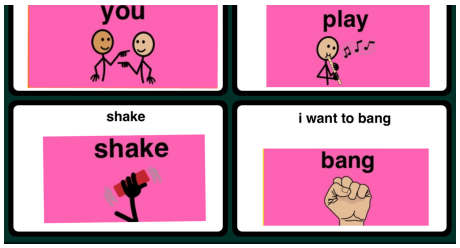
Errorless Opportunities

- Errorless opportunities provide a judgment free time where students are exposed to and explore new concepts.
- The concepts can range based on the individuals current skill level (e.g. errorless learning time where they learn that by hitting the switch something will happen on the screen or to learning that symbols can be combined to create a sentence).
- There is a shift in mind-set
  - All right vs. right/wrong opportunities

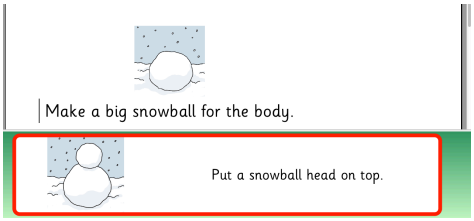
Errorless Opportunities

- Why is this important?
  - Shits focus to participation
  - The student is not being judged on competency and is not being "tested" at this time
  - There is NO wrong answer
  - Allows more exposure to concepts before being "tested" or having to use the concepts independently

Errorless Participation- Music

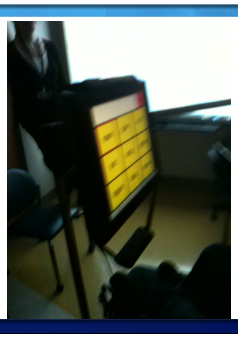


Errorless Participation- Writing



Errorless Opportunities- Video 1

Errorless Opportunities- Video 2



Independent Participation

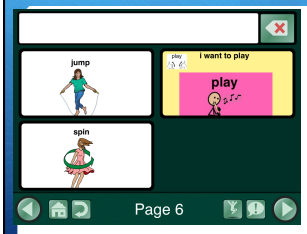
Independent Participation:

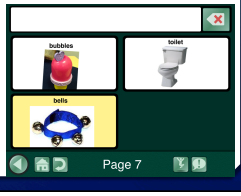
- Independent opportunities allow for the student to actively engage, initiate and direct.
- These opportunities require very little (if any) support from a clinician/educator/parent.

Independent Participation:

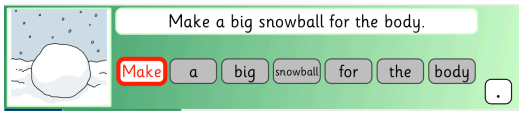
- Why is this type of activity important?
- In these types of opportunities, the modifications to the task and technology allow independent opportunities foster active participation and confidence.

Independent Participation:



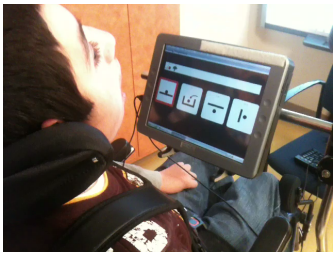


Independent Participation – Snowman Example



Independent Participation: Video 1

Independent Participation- Video 2



Supported Participation

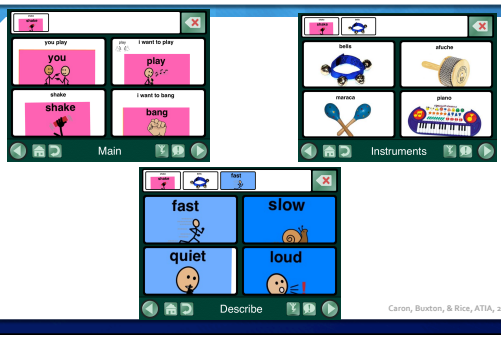
Supported Participation:

- Supported participation is an activity in which the student needs and requires assistance to engage
- The supports takes away certain demands
- Technology Modification (e.g. forced order sentences, highlight correct answer)
- Human modifiers could additionally support decreasing the cognitive load (e.g. navigating for someone, prompts) or motor demands (e.g. assistance with switch selection)

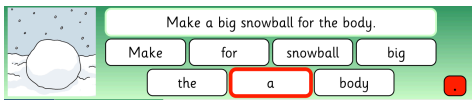
Supported Participation:

- **Why is this important?**
- Increasing complexity of task
- Adding more supports (human and technology) to get them to the "next level"
- Allows successful exposure to more advanced concepts

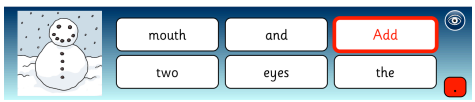
Supported Participation:



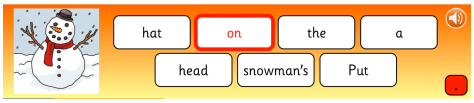
Supported Participation – Visual/ Auditory Model & Jumbled Order



Supported Participation – Fading Visual / Auditory Model & Jumbled Order



Supported Participation – Auditory Model & Jumbled Order



Supported Participation: Video 1

Introducing and using 2 switches

The Power of 2

- Start with non academic and non-language based tasks
- Getting motor pattern down
- Then introduce language once switches are mastered
- Sometimes allows access of two different devices
- Increased efficiency with step scanning with two switches
- Often difficult to identify two reliable switch access sites

R.O.- Two Switches
Introduction to Two Switch Scanning within Leisure Tasks

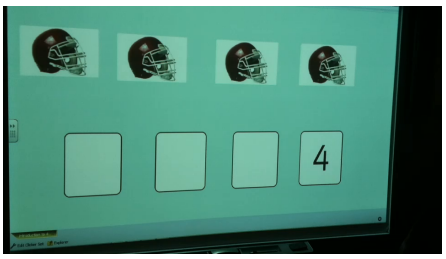
M.-
Two switches for directing game play

Agenda Item #3: Case Studies

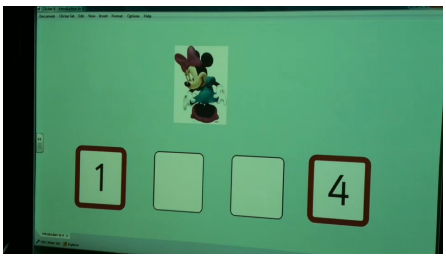
Case study- R.O.

- **S**tudent: 15 year old with spastic cerebral palsy, CVI, trach, moderate hearing loss
- **E**nvironment: Home based school program
- **T**ask: identification of sight words, language concepts, number correspondence
- **T**echnology: Dynavox with Speaking Dynamically Pro, SMART Board, Windows laptop with Clicker 6, Crick USB Switch Interface

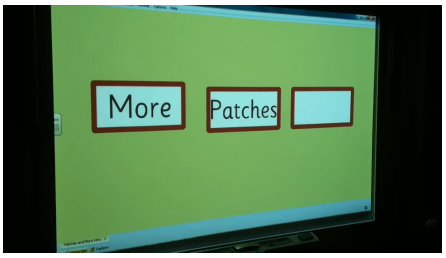
Case study- R.O. Errorless (Task: Counting Tech: Clicker 6)



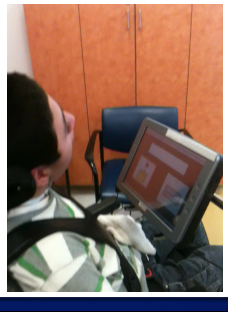
Case study- R.O. Independent: Task- Counting Tech- Clicker6



Case study- R.O. Supported: Task- Sight Words Tech- Clicker 6



Robert- Communication- Errorless vs. Supported (comparing 2 device set ups)



Case study- B

- **S**tudent: 8 year old with Autism, CVI, Cerebral Palsy
- **E**nvironment: Clinic, School
- **T**ask: Matching Task
- **T**echnology: Windows laptop with Clicker 6, Crick USB Switch Interface, GoTalk Now on iPad

Lessons Learned

Lessons Learned:

- 1. You have to Balance the Task and Technology
- 2. Need to be collaborative
- 3. Understand the Goal: participation, leisure, testing
- 4. Understand the Task: novel, preview, review, high cognitive demands, high language demands
- 5. Shift in thinking---limit the amount of time that "testing" occurs in your sessions
- 6. Consistency between different programs & different team members
- 7. You have to plan ahead

Balancing Task and Technology

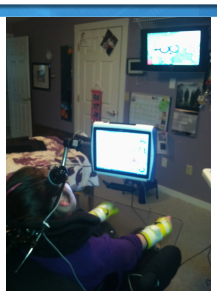
- Relationship between task and technology if they are both challenging the student won't likely be successful

Collaborative and creative approaches

- Collaborative and creative approaches to switch access for communication, leisure and academic tasks can produce successful experiences for people with complex disabilities.

Understand the Goal:

- Participation
- Leisure
- Testing Knowledge



Understand the Task

- What are you trying to have the student accomplish?
- What is the level of the task?
- Level of task has to do with language level and instructional materials
  - Novel
  - Preview
  - Review
  - High cognitive demands
  - High language demands

Shift in thinking

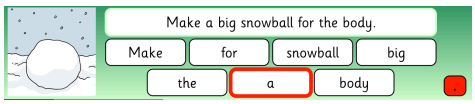
- limit the amount of time that "testing" occurs in your sessions

Consistency between different programs & different team members

- **Making things as consistent as possible**
- **Keep scanning patterns, timings, forced order, errorless writing features etc. as similar as possible to enable success**

Planning Ahead

- Planning both for the task and the technology
- Can't do tons of programming without understanding the task!



In Conclusion:

- Increase opportunities!
- Model, Model, Model
- Provide a judgment free time and time to expose to new concepts and ideas without providing competency
- Provide time where individual can participate independently (this set-up and task varies based on the individual)
- Provide a time where the activity is a little beyond where they are at, but they participate with supports
- You need to collaborate and plan ahead!

References

- Beukelman & Mirenda (2005)
- Zabala, Joy (1995)


Questions
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