Stepping Stones To Switch Access (Two Switch Step Scanning)

Linda Burkhart http://www.Lburkhart.com
Converted to chart format by Katie Stuhlsatz and Kathy Lalk, St. Louis Special School District Assistive Technology Specialists

STEP 1: SINGLE SWITCH: CAUSE & EFFECT

Definition of Step 1 (cognitive skill)	Implementation Ideas and Tips
Student begins to associate an intentional movement with the ability to cause something to happen (working on understanding cause and effect-connection between motor action and response)	*Cause and Effect (C/E) cannot be taught through prompting. It is learned through experience. *May need to begin with accidental switch activation. *Use existing motor pattern (a movement where the child will be able to get on and off the switch without help). *Learning C/E and new motor pattern at same time is too much. *Direct activation to start. When you are sure the student understands C/E, you can add a delay timer. Use short timed segments when using delay timer. *When learning C/E, if student does not have any response after 3x, change something about activity (motivation), switch (ease of access), placement (opportunity for accidental activation and release), etc. * Only use software applications that allow for direct activation (plays for less than 6 seconds after activation). *Data: *when evaluating understanding of C/E, don't dwell on inconsistency. *Looking for active engagement. * Anecdotal notes/observations are valuable. * Don't stay in Step 1 too long. (Children will habituate to the activity and loose interest. This can be misinterpreted as not understanding cause and effect)

Example Activities

Vibrating pillow or massager inside a puppet with battery adapter
Music (tape recorder with battery adapter), Rad Sounds, Everybody has feet in momentary mode
Sequencer device to play a short segment of a song upon each activation (add a few comments or cheers into the sequence)
Sequencer device with related silly sounds, vulgar noises, or musical notes/sounds
Simple voice output with "clap hands, tickle me, bounce me, swing me, etc".

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STEP 2: SINGLE SWITCH: MULTIPLE LOCATIONS AND MULTIPLE FUNTIONS

Definition of Step 2 (motor skill)	Implementation Ideas and Tips
Student understands simple cause and effect but needs practice intending and executing a movement for a specific purpose, different purposes or with different body parts, or when a switch is moved to a new location. *Research on motor learning shows that developing a motor skill to the level of automaticity requires practice that includes thousands of repetitions with intent, purpose and variation. Automaticity of motor skills means that the individual is able to use a particular movement to achieve a desired intent without conscious thought toward the execution of that motor task. The intent may originate consciously or unconsciously, but is focused on the purpose of the movement, not the movement itself.	*To develop motor automaticity: repetition with moderate differences is critical to avoid habituation. *Practice activating switch with one body part in multiple locations, or with different body parts. Example-hand activating switch on tray at left side, midline, right side. Example-hand activates switch, then try switch at left temple or other. * Vary the switch location but be careful not to frustrate the student by switching too often. Leave the switch in one place long enough for the student to feel accomplishment. *Focus on social and pragmatic timing without stress of exact motor timing from pre-set time in software/device (For example: use greeting, informing, requesting, taking turns, etc). *Focus on consequences that are short, emphasizing function. *Experiment with moving the switch site to a different body part after a few successful activations (keep this fun and like a game for the child, not frustrating)

Example Activities

*Use switch adapted battery powered toys with a mission : animal toy kicking ball to a friend, battery powered spinner to play game, spin art
*Use co-planned sequenced social scripts created with the student
*Musical instrument recorded on single message device. If using a sequence device, record same instrument with slightly different rhythms on each level of the sequence device.

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STEP 3: TWO SWITCHES-TWO FUNCTIONS

Definition of Step 3 (cognitive skill)	Implementation Ideas and Tips
Student is able to activate one switch in multiple locations. Working on developing the student's understanding that two switches do two different things. (developing cognitive skills of discrimination and memory)	*2 switches with 2 different functions *2 switches with related objects or two functions on one object that are related Increase motivation by increasing cognitive engagement and control *2 switches introduces element of meaningful choices instead of "do it" or "don't" *2 switches trial and error (1 works, 1 doesn't) *2 switches positionally related to function (object permanence-Left Right activities on Two Switches to Success CD) *2 switches social turn taking

Switch 1	Switch 2
All turn it spinner	Voice output comments
1 voice output with one function	2nd voice output with another function
Computer	Switch related toy or voice output message with comments
Classroom Suite (2 switches 2 functions LB CD)	Classroom Suite (2 switches 2 functions LB CD)
Electronic Storybook (Classroom Suite, PP, Clicker, BMPlus) with a single switch to advance	Voice output message with repetitive line, sound effect, comment
Two separate but related activities on the screen in computer activity. Software ex: Switch Skills for Two Set 1/2 Inclusive TLC: Tower is built up	knocks the block tower down

Notes: For additional software activities specific to this Stepping Stone refer to SSD Switch Accessible Software handout

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STEP 4: LEARNING TO TWO SWITCH STEP SCAN (move, move, get)

Definition of Step 4 (cognitive skill)	Implementation Ideas and Tips	
This step is for children who do not yet cognitively understand the concept of two-switch step scanning. The student may appear to activate the 2 switches randomly and without discrimination of function. The focus here is the student understanding that one switch moves something along a path (by repetitive activations) and the other switch selects or "gets it" based on the moved item arriving at a given destination. (Note: children who do cognitively understand this process, but simply need more practice to develop motor automaticity, should skip this step and move on to step 5.)	*Switch 1 is "mover" or "lister", Switch 2 is "get it" or "selector" switch *Allow only one switch to work at a time. If student tries 2nd switch the lack of feedback will direct them back to switch 1. *Provide experiences where 1 switch moves something across the computer screen and the 2nd switch activates or selects the item only when it has arrived at a given destination. This is particularly helpful for students who have difficulty seeing traditional 2-switch step scanning with highlighting as movement. *MODEL, using the switches as the student does. You, a puppet, doll, or action figure takes turns and self-talks aloud (it's getting closer, closer, it's there!) When modeling, allow extra time in between each switch activation for student to attend and process. Make sure student has a clear view of you and the activity. Consider using the child's two switches in the same location he uses them, or at least on the same side of the child's body as you face the child. Use the same body part as the child uses, for example if the child uses his cheek to activate the switch, use your (or the puppet's or figures') cheek. When taking a turn with the child's switches, pause (or use slow motion) before activating the second switch to see if the child will take that opportunity to activate it herself. You can model step scanning when choosing an activity to use with the child. Ex: use a menu of games with the child's switches, to select one activity. The strategy of slow motion or pausing before the second switch is also effective. *Avoid direct verbal prompts such as "get the switch" and use more nonverbal, natural cues and slightly delayed feedback: "You moved it", "it is almost there", "it's there", "you got it!" *Students with severe motor difficulty may benefit from partner-assisted scanning strategies as a teaching method	
Activity Examples	**Switch 1**	**Switch 2**
Pig knocks down blocks, doll delivers snack, etc	Battery powered switch toy that moves (walks, hops, crawls, etc) to a location	Voice output with related destination message(s). "I got it", I'm there".
Move-Get" activities on the computer Software example: Linda Burkhart Two Switches To Success	Moves the object across the screen Software ex: person walks across screen to kite each time switch is pressed	Selects the destination/object and causes an action Software ex: when person reaches kite second switch makes the person and kite dance
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STEP 4 A: SIDE STEP: SINGLE SWITCH SCANNING	
Definition of Step 4A (cognitive skill)	**Implementation Ideas and Tips**
Step 4a is a side step. As you are working with a child, periodically check to see if they have developed automaticity of switch activation. Specifically, if the child quickly activates switch upon intent during an activity without having to think of/shift focus to the motor skill of activating the switch you may change focus to develop automaticity with scanning using one switch. (automatic scanning)	*Demonstration of mastery of automaticity with a single switch indicates the student can activate the switch in order to get the desired consequence in a variety of environments with a variety of distractions. This means they can activate the switch without thinking about the motor plan. *Learning takes slowness, 2 switches allow time to process and develop neurological connections and pathways. *Automaticity also indicates the student can activate the switch quickly. *Automatic scanning may require less motor effort for some children, but is often cognitively more fatiguing because of higher demands on concentration, holding attention to task, and timing of motor movements. *In order to develop motor automaticity, many children do best pursuing 2-switch step scanning by following steps 5-8 and then possibly returning to this step to begin single switch auto scan. *Follow steps 5-8 with automatic scanning, inverse scanning, or step scan with a delay as the access method. *Present single switch activities that require timing. *Observe closely to make sure student can stay actively involved, is not over fatigued.
Notes:	

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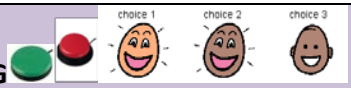
STEP 5: TWO SWITCH STEP SCAN: ERRORLESS LEARNING



Definition of Step 5 (motor skill)	Implementation Ideas and Tips
Student is beginning to understand, or already understands, how two switch step scanning works. The student now continues to work on automaticity for switch activation as well as develop automaticity for the motor coordination of the process of step scanning. Student is practicing with a variety of opportunities where any choice works. Note: If the child appears very intentional in step 5, move on to step 6.	*Errorless equals "Failure free with feedback" (Erikson) *Errorless learning may allow the student to make mistakes or unwanted choices with clear strategic feedback that allow for student to problem solve from an intrinsic drive. *MODEL- self talk (see step 4). "no, no, yes". *Do not ask the child to target your preference at this step. Allow child to select what they want and provide feedback NOTE: In the field of special education, sometimes the term 'errorless learning' is used to describe a strategy that doesn't allow the child to make mistakes. In this application, errorless means the opposite: A learning/play environment, where any choice works, but each choice provides feedback. This allows the child to engage in problem solving skills without requiring 'correct' performance.

Activity Examples	Switch 1	Switch 2
Communication	Battery operated rotating plate activity	Voice output (with a related comment)
Communication	Step by Step to list choices (step by step providing partner assisted scan)	Voice output to say "That's it"
Writing: Failure free with feedback	step through choices for errorless story, rhyme or letter	Select choice (picture, word, etc) to insert into story, rhyme or letter
Communication: Sing song	Step through verses of a song	Selects verse to be sung in any order
Communication: Simon Says, Follow the Leader, Potato Head, Draw a Face, Etc.	Use communication device to step through choices to direct a person or play a game	Makes the selection to direct the action: etc. with options that all make sense
Writing: "Scribble" with a talking word processor	Steps through limited set or full alphabet	Selects letters
Literacy: listening to or telling a story, silly saying or tongue twister	Step through verses or computer voices	Select the verse or select read all
Music: play a song using iTunes	Step through song list (keyboard key is right arrow)	Select song to play (key equivalent is enter)

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Communication using partner assisted scanning Ex: Gayle Porter's light tech multi-page communication books (Pragmatic Organization Dynamic Display Communication Books – PODD) Melbourne, Australia. More info at www.cpec.org.au	Step through vocabulary in an organized pattern	Select Yes/No response for each item
website activity or website software (not accessible)	Partner moves mouse to next item on the screen when directed by child using voice output device that says "next"	Sends mouse click or voice output message that directs the partner to click Note: it may be helpful to use a large or fancy cursor, and name each item with an auditory cue as the mouse is placed on it.
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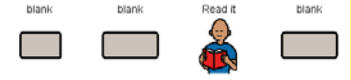
STEP 6: TWO SWITCH STEP SCANNING TO A TARGET



Definition of Step 6 (motor skill)	Implementation Ideas and Tips	
Once the student has had enough practice at the errorless level, you can introduce some activities that require them to reach a specific target. This step is often used when the child appears to continue selecting items randomly and doesn't appear to be trying to select a specific item based upon their intent. (Note this is something that you have to observe by the child's attention, responses, interests, social reactions, and patterns of switch activation)	*Give student one exciting or interesting target to aim for- all other items are neutral *Use a word like "click" or "nothing" repeatedly for neutral items. Have student look/listen for a target word such as "read", "sing", "show me". *Have at least 3 or 4 items in every list and limit the target item from being the first in the list (two items is not a list and may be confusing to student) *Neutral or blank items have feedback that shows it is not logical or is not reinforcing. Goal for student to select neutral/blank items less over time. *# of clicks before blank must be varied so student is not just learning a motor pattern and stays cognitively engaged to make a selection. *MODEL self talk "hmm, no, no, yes- that's it"	
Activity Examples	**Switch 1**	**Switch 2**
Computer Software with choices on the screen for social interaction, directing an adult, sensory play, nonsense sounds, etc. Array of choices includes a motivating target and "blank" choices without consequences. Pre made software example: Linda Burkhart Two Switches To Success- Left Right Activities * Clicker 5, Classroom Suite, & Boardmaker Plus are customizable to make "move, move, get" activities that are highly motivating to your student(s).	Moves the cursor along the array of choices	Selects the choice and obtains the consequence (ideally the student will not pick the "blank")
Move, move, get activities on the computer. Software example: Switch Skills for Two- Set 2 Inclusive TLC	Moves spotlight across the stage to reveal a hidden character (musician)	Selects the character when he/she has been highlighted and the character dances, plays music, etc.
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STEP 7: TWO SWITCH STEP SCANNING FOR ACCURACY	INCORRECT	CORRECT	INCORRECT

Definition of Step 7 (motor skill)	**Implementation Ideas and Tips**	
Student needs practice to increase accuracy and beginning to demonstrate knowledge within activities that have incorrect answers. At this step, the student is developing the ability to integrate the motor component of step scanning with the cognitive component of selecting an item for a particular reason or purpose. With more than one target in the array, the cognitive load to select desired targets requires more engagement of cognition as the child refines automaticity of the motor skill.	*Activities with choices that are more logical than others, or show more personal opinion *Include student in developing what choices will be available *Add slightly negative or illogical items in array of choices *Activities with correct and some incorrect answers	
Example Activities	**Switch 1**	**Switch 2**
Communication displays: select vocabulary items that have different pragmatic intents so that the responses from listeners provide clear feedback for the child's comments. For example: go, stop, tickle me, do it again, louder, softer, faster, slower, etc.	Steps through vocabulary/phrase etc choices (some have more personal opinion/preference)	Selects desired communication message
Literacy: Play with sounds, letters, constructing a rhyme or sentence where some items make sense and others do not. (Classroom Suite, Clicker, Scan and Paint, Story builder)	Steps through sounds, letters, words, phrases (some make sense and others do not)	Selects desired letter, word, phrase to write
Software Example: Learning to Two switch step scan Judy Lynn Level 7		
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STEP 8: TWO SWITCH STEP SCANNING: REDUCING TIME FOR SUCCESS & DEMONSTRATION OF KNOWLEDGE	
Definition of Step 8 (cognitive skill)	**Implementation Ideas and Tips**
Student has developed motor automaticity of switch activation and the step scanning process. Student can now use step scanning with more ease, can focus on cognitive content of activity to both learn and demonstrate knowledge.	* Design activities to increase efficiency. Ex. Present limited array at appropriate times (combining letters with word endings) *Use feature of natural branching to present limited number of choices at each logical step of the sequence of an activity, composition or story. *Set up array so that illogical or incorrect items disappear after one selection *Provide multiple choice instead of fill in the blank (or fill in the blank with multiple choices) *Provide feedback from computer (voice or text) for illogical choices (teachable moment) *Use word walls/banks for frequently accessed words *Consider word prediction *Consider encoded alphabet displays for spelling (Student selects a group of letters and then the individual letter in that group (abcde, fghij, etc.) *May use rewards for “correct” answers for harder cognitive tasks
Example Activities	
*Spelling: present student with only letters that are needed instead of whole alphabet *Sentence Writing: use sentence starters, endings, and phrases related to academic learning. Provide word banks. *Provide practice for rehearsing or studying for a test in a student controlled flash card format *Present access to whole alphabet through group or row/column scanning *Present access to a larger number of options through group or row/column scanning or encoding (section, color and number)	
Notes:	

Last updated 10/12/12

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