SWITCHING TO SUCCESS
STAGES IN SWITCH DEVELOPMENT

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Note: the word 'Learner' will be used throughout this article to refer to any person of any age learning to work with switches. The use of the uppercase 'L' is an acknowledgement of the central importance of the Learner in all that follows.

Learners who use switches normally face a more challenging task than peers who are physically able to directly select (Vanderheiden G. 1976; Harris D. & Vanderheiden G. 1980; McDonald E. 1980; Harris D. 1982; Shane H., Lipschultz R., & Shane C. 1982; Saya M., Pelikan Y., & Barr L. 1984; Vanderheiden G. 1984; Gunderson J. 1985; Vanderheiden G. & Lloyd L. 1986; Blackstone S. 1989; Light J. 1989; Fried-Oken M., Howard J., & Stewart S. 1991; Ratcliff A. 1994; Whittle H. & Townend S. 1995). This paper details a possible route to success in using switches. It details the authors' present beliefs about good practice. As we are always learning, all our present beliefs are subject to change!

For some Learners a switch provides a necessary interface with the external world: a vital, and almost independent, link that would be difficult to achieve without it. This paper details the steps involved in developing and grading switching skills in the novice Learner.

A switch is a device that enables an individual experiencing a learning difficulty and/or a physical disability to operate some part of a mains or battery-powered system through a single action. There is a huge range of commercially available switches and, while it is not the purpose of this paper to detail them, the basic types are covered below:

-        Standard switches (Big Red, Jelly Bean, Access Switch, Buddy Button …);
-        Air Pressure Switches;
-        Wobble Switches;
-        Grip Switches;
-        Thumb Switches;
-        Suck & Puff Switches;
-        Integra Switch;
-        Lever Switches;
-        Switches as toys;
-        Proximity Switches;

-         Mercury Switches (Modern types contain no mercury!);
-         Eye Blink Switches;
-         Piezo Electric Switches;
-         Tongue Switches;
-         Other Specialised Switches (String Switch, Twitch Switch …);

There is no pretence that this is a complete list of every switch type on the market. There are a vast number of switches in all shapes, sizes, materials and colours that can be operated by hand, foot, head, indeed any part of the body over which the Learner has some control. Even if the Learner has a severely restricted range of movements there is a switch that can sense and act upon it. There are a number of switches that are in the form of toys that make sounds and light up and even vibrate. There purpose is to encourage Learners to interact with them for their own intrinsic pleasure prior to their subsequent use as a switch. Such a range of switches can be seen on the Enabling Devices web site (http://enablingdevices.com/catalog).

If we are using switches to enable a Learner to access the world, it will be necessary to set a number of targets:

TARGET: The Learner will be able to control her/his environment through switch activation.

As the example given is a large target, it will need to be broken down into a number of (much) smaller quantifiable objectives that will allow staff to recognize when the target has been achieved. It is impossible for this paper to set the exact objectives for every single Learner as each is an individual and so objectives have to be personalized. Thus, the objectives outlined in this paper are but examples of possible objectives and may be adopted, adapted and rejected as is appropriate. The Learner, who has no vision, for example, will not be able to 'look at the switch' but nevertheless may be made aware of the (tactile) switch in a specific location in his/her personal space.

Note: prior to reading the paper below you are advised to familiarize yourself with the ten switch rules as detailed in Appendix One.

1   Preparation – Choosing a Switch

Novice Learners will likely have little or no awareness of what a switch is or what it can do. Thus, there may be little or no motivation for them to interact with a switch presented for the first time. Furthermore, for some individuals, their physical ability may (severely) restrict switch access. Thus, the first step is to make a decision as to which of the plethora of available switches may best suit a particular Learner. This decision is always something of a 'best guess'. However, as your experience grows, you will find that you have a good idea what might work best.

The following may have some impact on the consideration of the choice of a suitable switch (in no particular order):

- Physical ability of the Learner: will s/he be able to access it?
- Positioning of the switch. Mounting of Switch;
- Goal of switch: this may change with skill development;
- Type of switch;
- Colour of switch;
- Size of switch;
- Shape of switch;
- Switch texture;
- Number of switches to be used;
- Cost of switch (some specialized types of switches can be expensive).

While the initial objective for the Learner in relation to the switch may be as simple as encouraging Learner interaction, the switch selected may not be the best for this task. We may find that the Learner ignores the switch or, presently, finds physical access a little difficult. Thus, we might start with a different type of switch (or modify the existing switch) with the aim of 'progressing' to our selected switch type at some specified future stage. While, it would be desirable to use the same switch throughout it is not always necessary.

We may modify the switch in some way to make it more interesting to the novice learner. We can remove the modification later, if desirable. Modifications to switches include adding textures (unless we obtain a switch that already has a texture) or embellishing the switch in some way (See the section on switch awareness below) .

Switch textures can be easily achieved by modifying the switch cap rather than the switch itself. Big Red, Jelly Beans, and Access Switches are available with switch caps. Spray the surface of the switch cap with glue through a circular template and then sprinkle (or otherwise attach) the desired surface to the cap. In reality, it does not really matter what texture is used as long as:

- it is safe and does not cause injury to the Learner;
- it is used consistently;
- it can be cleaned;
- it can be 'sensed' by the Learner (little point otherwise!);

2   Switch Awareness

The next step is to develop an awareness of and a tolerance for the chosen switch. It has already been noted that it is possible to add a texture to a switch's surface. The texture could help provide additional haptic input for the Learner and thus increase switch awareness.

NOTE: Switch, in the singular form, is used advisedly. While the goal may be to work eventually with multiple switches, don't be tempted to start in that way. Keep it simple!

While the Learner may not be switch aware, or may 'choose' not to interact with the switch as selected, there may be something with which the Learner already interacts. For example, the Learner might have a fondness for teddy bears. If a small teddy can be adapted so that the stick part of a wobble switch will fit up inside its body (ouch!) (in such a way that it is not easily pulled off) then, a plain wobble switch can be made more motivating. In this way, a reluctant Learner, may reach out and interact with the teddy and, at one and the same time, activate the switch.

The Learner just pushes the switch away and is intolerant of it. Great! If the Learner pushes it away, s/he is aware of its presence: progress has already been made! Furthermore, if the switch is mounted sturdily and thus, secure in its position, the Learner's action will activate the switch!

Yes, the Learner's action activates the switch but s/he is becoming distraught at its presence. It is important that the switch activates something that is going to be highly motivating (for the Learner). While the Learner may make no connection with reaching out and touching the teddy bear with the sound of a piece of favourite music that follows, if, every time the bear is accessed, the same response occurs, then there is every chance that the Learner will begin to make a connection. What is needed (on the end of the switch) is the **Best Thing in the World (**for the Learner).

In some cases it will be difficult to find things or activities that are interesting for the individual. When this is the case then measures must be taken to improve the situation: in such instances teaching should begin by creating interest and awareness. (Von Tetzchner S. & Martinsen H. 1992a)

What is the Best Thing in the World? It will be different for each individual but it will be a POLE – **P**erson, **O**bject, **L**ocation or **E**vent. Is it possible to put all the elements of a POLE on the end of a switch? The simple answer is yes! Even a person! If the person is available during the Learner's interaction with the switch, the switch can be attached to a BIGmack (or similar) that is programmed to call the person's name. As the name is called (through the activation of the switch) so the person appears and interacts with the Learner for a short amount of time. It is important that the interaction itself prevents the Learner from further access to the switch until the person has terminated the interaction and left the Learner alone again. The length of the interaction should be kept short (perhaps a couple of minutes only). The person should leave saying 'if you want me, call me!' and point to the switch and the BIGmack.

That's no good! We haven't got a person who is available to do that. It is mum who the favoured person is and she isn't in school. It is possible to put images of the favoured person into a simple PowerPoint presentation (for example) and, on each activation of the switch, a (different) picture of the person appears on the computer screen with an accompanying sound (for example the person saying 'hello' to the Learner.)

The Best Thing in the World for Sally is going outside in the garden, how can we put that on the end of a switch? If a switch is attached to a BIGmack (or similar), it can request the provision of a 'place': "Garden please". In this instance, a member of staff must be on hand to take Sally a walk once around the game before bringing her back and placing her in exactly the same relationship with the switch as she was before (if the switch is not wheelchair mounted).

Don't be silly, we haven't got the staff to do that! Then, do it while staff <u>is</u> available and do something else while staff are not available. <u>Never leave a Learner with a switch that makes a request for a POLE that cannot be supplied</u>. Obviously, some POLE items are easier to provide than others: playing a favourite piece of music can be achieved repeatedly through switch use without any interaction from a Significant Other (other than the original setup).

Sometimes switch awareness may be a bit of trial and error. A red switch may provide more response than a blue switch for example and yet everyone thought that blue was the Learner's preferred colour.

Discovering the 'right' switch and mounting it securely in the correct position is an art in itself. However, once established, it is a platform on which further learning may be built and the Learner may progress.

Objective 1: The Learner will look at the switch when it is presented.
Objective 2: The Learner will tolerate the switch in his/her personal space.
Objective 3: The Learner will reach out and attempt to touch the switch;
Objective 4: The Learner is able to activate the switch (to create an effect).

It should be noted that there is, as yet, no claim being made that the Learner is making a connection between the switch and the POLE. No claim is made of understanding: we are simply establishing the switch's presence with the Learner.

Don't make assumptions: this Learner has a GSCE in astrophysics. Of course, he understands that the switch is controlling the pole. He's a bright fellow. We are not saying that all Learners will be unaware of connections between switch and POLE. We are saying that we need to establish that this is the truth and not just an assumption on our part. Be wary of making early claims that are not justified. Another question springs to mind: Just how did this Learner obtain a GCSE in astrophysics without a switch?!

3   Switch Accessibility

NOTE: Part of this section is so tied into '2' above that it is very difficult to separate them.

In order to activate the chosen switch, the Learner has to make some form of contact with it. This will require some physical effort and control over some part of the Learner's body. While some switches only require the minimum of movement, there are many that require the Learner to move a limb (for example) to press (or otherwise move)(some switches will operate on the release of the switch surface) a part of a switch. The Learner has to be able to target the switch, move his/her hand (or other body part) to the switch accurately and activate it by pressing or releasing (or other). The range of objectives for this stage will vary considerably therefore, depending upon the type of switch in use and the physical abilities of the Learner.

Do not be tempted to move too far, too quickly at this stage. For example:

- do not introduce two switches.
- do not introduce scanning.
- do not introduce a timing factor.

Rather, the activation of a single switch at any time should cause a POLE event. The POLE event in question, as has been outlined earlier, should be highly motivating for the Learner, such that there is a good chance that the Learner will want to cause the POLE event to occur again (and again). It is therefore important that a balance be struck between:

- making the event too long such that frequent repetitions of switch interaction are less likely;
- making the event too short such that the Learner is less aware and is less motivated.

Objective 3: The Learner will reach out and attempt to touch the switch.
Objective 4: The Learner is able to activate the switch (to create an effect).
Objective 5: The Learner will remove his/her hand (other) from the switch after activation is made.
Objective 6: The Learner will activate the switch once for each POLE event.

As you can see, Objectives 3 and 4 are repeated in this section as it is tied to item 2 detailed earlier. However, Objectives 5 and 6 draw our attention to further problems concerning removal of the hand (other) from the switch. There are a number of possible issues here:

- The Learner can activate the switch but cannot remove his hand from the switch so that it is being continually activated. This may not matter initially depending on the POLE event. A BIGmack will only play its message once and stop until the switch is released and activated once again, for example. However, the yapping dog will continue to yap until the switch is released. This may not be a problem: the Learner may eventually release the switch by accident or the switch may be connected to the POLE event by some 'timing interface' that will override any continual activation. It becomes a problem if the yapping

dog falls off the table each time and requires a continual staff presence or the Learner cannot get his/her hand off the switch in order to make the next activation!
-       The Learner continues to activate the switch repeatedly over and over again with little reference to the POLE event.
-       The Learner moves the switch as it is accessed making it less accessible with each Activation.

While these are indeed issues, we should not forget that the Learner has taken a step forward in interacting with the switch and, as such, progress has been made. Furthermore, such issues can be resolved:

-       An inability to remove a hand or other body part from a switch is only a problem of switch orientation. While the switch is positioned such that the Learner has to place his/her hand on (top of) it to make an activation, there will nearly always be a problem. If the switch is mounted upside-down, slightly above the Learner's hand, such that s/he has to raise her/his hand (only slightly) to create the activation, gravity will release the Learner's hand from the switch after the activation has been made.
-       Repeated activations of the switch need not be a problem at this stage of development although they will need to be tackled at some later point. We need to ask ourselves 'why?'. Why is the Learner activating the switch over and over? What is motivating about doing that? Can we remove such motivation without removing the POLE? Are there ways of training a Learner to stop repeated interactions? The answer to the latter is 'Yes'. Discussed below.
-       Movement of the switch signifies that it is incorrectly mounted. We should not try to teach the Learner to be gentler in the switch interaction rather, make the switch (mount) more robust.

An inability to remove a hand (other) from a switch is NOT a failing of the Learner but, rather, a failing of the tutor. It indicates that our original decision for the switch position was likely incorrect and that we need to re-evaluate the orientation and/or spatial position of the switch. (and perhaps the switch type itself).

Ensuring the best position of a switch may involve a multi-disciplinary process with advice from a Physiotherapist and an Occupational Therapist. However, a word of caution! The Physio or the OT may have additional objectives in mind: they may want to position a switch to exercise a particular body part or correct an incorrect posture. While, these will undoubtedly be laudable objectives, your objective is to make the switch as easy as possible to target for the Learner and, as such, this might conflict.

There are many switch mounting systems on the market some more robust than others. It will become obvious if the switch is mounted poorly as it will create access problems: it is clearly better to provide the 'appropriate' switch mounting solution from day one.

Not only might the mounting system move but also there may be changes in the Learner and the Learner's positioning. Younger learners tend to grow and their bodies change in size and often in physical ability. Some learners gain function and some loose function. Wheelchairs may be

adapted or swapped completely; a new head rest or a new type of wheelchair tray may be purchased. The addition of a wheelchair pommel, for example, can prevent the once functional use of a knee-activated switch. It follows that both the mounting system and Learner switch access need regular monitoring and review. How regular? That is impossible to generalise but, as a rule, it should be at least termly.

Unwanted repeated switch actions can be addressed through, at least, four techniques: **A**ccess, **B**locking, **C**hanging, and **D**ifferential reinforcement. While, there is no guarantee that any will produce the desired result, it is our experience, that the latter is the most successful. These techniques are addressed fully in Liberator's *Switching to Communication* course. Each is detailed, in brief, below:

Access – change a component of the Learner's access to the switch: perhaps the switch angle or the switch position, such that the switch becomes slightly more difficult to access. Does this have an effect on repeated activations?

Blocking – Block access to the switch when switch activations are inappropriate. Either remove the switch or put something between the Learner and the switch. This will stop repeat activations. However, when the blocking stops, does the Learner return to repeated activation?

Changing – What is it about the switch that causes the Learner to want to activate repeatedly? Is it the click? Then use a 'clickless' switch. Is it the colour? Then change the colour. Is the feel? Then change the feel. Is it the shape? Then change the shape … Do any of these have any impact on repeated activations?

Differential Reinforcement – It is possible to set up a PowerPoint presentation such that it will ignore repeated switch activations and only activate (play music, show a video, display a picture …) when the switch activations cease. Thus, you can leave the Learner activating the switch over and over. Eventually, the learner tires and stops activating the switch and PowerPoint is activated! The Learner perks up and probably will start to activate the switch once again over and over. PowerPoint ceases and nothing happens until, once again, the Learner ceases to activate the switch. This should take a lesser time than previously. Eventually, the Learner comes to 'realise' that only when s/he does not repeatedly activate the switch that the reward appears within PowerPoint.

4   Cause and Effect

Once able to access the switch, it is necessary to establish that the Learner has Cause and Effect cognition. It cannot be claimed, simply because the switch is activated and the yapping dog moves, that the Learner has understood the connection: the Learner's understanding must be made explicit. There are a number of criteria that, if met, would tend to suggest that the Learner has established cause and effect:

- The Learner tries to activate the switch only when the POLE event has terminated;
- The Learner keeps attempting to activate the switch until successful and then ceases all attempts until the POLE event terminates;
- The Learner goes out of his/her way to operate the switch and then, once successful, stops;
- Observation of consistent use over time (days, perhaps weeks) with different POLES in different settings demonstrates that the Learner has the concept of Cause and Effect.
- All other explanations for the Learner's behaviour have been eliminated.

Ensure that the sole explanation for the observed behaviour is the Cause and Effect skill sought. It is very easy to be fooled and make the assumption that the Learner has C&E when, in fact, there is an alternative explanation.

How do we establish C&E? What we are doing is **consistently** pairing an action (activating the switch) with an event (the POLE). It is hoped that, after a period of time (which will vary from Learner to Learner), the Learner will come to realise (eureka!) the action of the switch is causing the POLE event. It is also hoped that the Learner will come to the realisation that s/he has the power to control his/her environment in this fashion.

Objective 7: The Learner activates the switch only when the POLE event has terminated.
Objective 8: The Learner continues in the attempt to reach the switch and then ceases when the switch is activated and the POLE event is enabled.
Objective 9: The Learner demonstrates awareness of Cause and Effect consistently over X days, in Y environments with Z different POLE Events.

5   Timing Switch Access

There are instances where a Learner may have to access a switch in a specified time frame. This is particularly true for Learners who will be using a form of (computerized) scanning that is partially (at least) automated. Simply put, whilst scanning, a variety of options are presented to the Learner one by one. As the scan reaches and presents the required option, the Learner's task is to activate the switch and make the selection before the scan moves on. In nearly all instances, the scan rate can be altered to suit the ability of the Learner. Some Learners have a variable rate of access, sometimes getting excited and taking longer than normal. In this instance, timing has to be set to allow for the variety of access speeds.

If the Learner is only ever going to use single switch direct activation, multiple switch direct activation, or two switch step scanning, then timing of switch activation is not as crucial. In the majority of instances nothing will happen until the Learner makes activation: there is no automated scan and, thus, the system is slave to the Learner. However, one can envisage instances where timing is more important even to such a Learner: for example, if s/he was playing some game with a peer (or a computer). Think of the old space invaders game, for example: the switch must be activated so that the gun can fire at the descending aliens when the alien aligns with the gun. Timing is vital. Therefore, while timing is less crucial for Learners working with non-automated scans, it is <u>not unimportant</u> in every instance.

Thus, we can envisage a set of objectives that cover aspects of time in addition to space. Objectives in which the Learner is required to access a switch on command or on an external prompt.

There are a number of ways to help a Learner develop such skills. We can begin away from switches altogether: in making a choice in school, the choice items can be presented at a constant rate by a facilitator one by one until the Learner indicates a choice.

-        "Do you want orange Juice?"   … SHOW ORANGE & PAUSE
-        "Do you want apple Juice?"   … SHOW APPLE & PAUSE
-        "Do you want blackcurrant Juice?"   … SHOW BLACKCURRANT & PAUSE
-         Return to beginning

Where the pause is governed by the Learner's ability to respond.

There are, at least, two possibilities in the above example: the items are displayed one at a time and hidden away at other times OR the items are displayed in a row at one and the same time and the facilitator points to each to indicate the item currently being selected.

There are a number of computer programs that will also offer some form of simple timed scanning option. Some are better than others but, as new ones are entering the market almost every week, it would be unwise to single out any particular program. It is also possible to create your own scanning access programs in PowerPoint: although a little complex (not complicated), each piece of the process is simple in itself.

There are also devices that allow for scanning training. The FL4SH unit from AbleNet, for example, will allow the activation of a POLE event on the selection of a particular cell from a group of four. Go here for a video (You Tube) example of FL4SH: http://www.youtube.com/watch?v=3qolIMCrC34

Thus, the following objectives may not be applicable to all Learners:

Objective 10: The Learner will activate the switch within X seconds of being instructed by a Significant Other

Objective 11: The Learner will activate the switch appropriately in response to an automatic scanning mechanism (to indicate a blind choice*)

**Objective 12: The Learner will operate the switch in response to and anticipation of a POLE event**.**
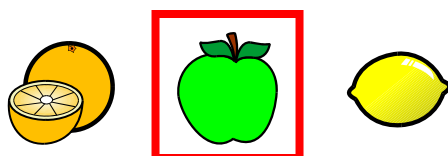
* for example, if three options are available (ORANGE, APPLE and LEMON) from a simple scanning linear overlay and:

- I ask the Learner to pick out the APPLE and to tell another member of staff this choice;
- I ask the other member of staff to watch and see what is selected;
- BUT do not inform the member of staff which one I asked the learner to pick out.

Then, if the Learner produces a correct selection, either it was a complete fluke or the Leaner has the necessary skills. Repeated trials will eliminate the possibility of a fluke.

Yes but my Learner forgets the one I picked out. That does not mean he cannot do the task. It tends to suggest it! However, there is a way to overcome the memory barrier. Find an old box and place a second, similar APPLE in the box such that the Learner can see it at all times BUT the assessing member of staff cannot. Now, memory is not an issue, the Learner's task is to tell the staff member which of the three fruits he can see within the box.

** for example, in a space invader game.
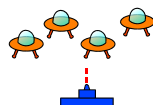
As was covered earlier, scanning can begin without the use of a switch or any electronic system: items can be presented in a 'scanning fashion' from which the Learner may choose. Initially, we would advice a single item presentation scan …

Apple (hide apple), Orange (hide orange), Banana (hide Banana), Apple …

Then we can step one pace forward to a multi-presentation scan…
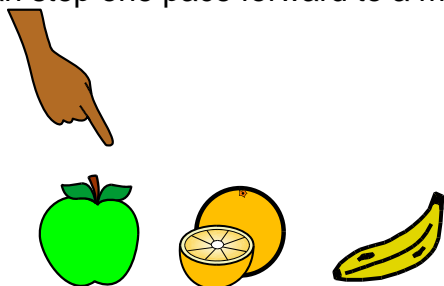
Apple, Orange, & Banana (on table top)

Point to each in turn saying 'Do you want Apple (Orange, Banana)'
Vary length of time on each according to need of Learner.

The next stage is to introduce a switch (if this hasn't been already mastered). Once this has been successfully achieved, the Learner can be introduced to a single switch scan. A simple PowerPoint scan is a good way to begin: each activation of the switch moves to a new slide. Each new slide might show something that the Learner loves, combining music and pictures and even video. A few slides should be boring however. The purpose of this is in the observation of the Learner's use of the switch. Does the Learner access the switch quickly on the boring slides to move it on to something more exciting? Does the Learner remain on the exciting slides for longer (not activating the switch)? This would suggest an excellent grasp of switch use.

Following this, introduce some simple scanning system such as the FL4SH from AbleNet (or the 4Talk4 from P&G). Leaving all but one cell blank (to keep the task relatively simple), ask the Learner to activate the switch as the target cell is reached. If successful, the target cell should operate some 'reward' for the Learner's achievement. (Note: The FL4SH unit has superior scanning lighting although the 4Talk4 has four output jacks to the FL4SH's one)(The 4Talk4 as depicted is being operated by 4 switches in direct mode).

We are trying to achieve a staged, progressive route to a target destination. Some Learners will remain with a single switch, although attempting the introduction of a second switch is always worth trying.

Gradually increasing the number of symbols on the FL4SH or the 4Talk4 makes the task a little more complex and, as such, demands more of the Learner. We can progress the Learner from a choice of one out of one (other areas blank) to a choice of one from four (all locations symbolized) as each stage is mastered.

6   Moving from One to Two Switches

At some point we may have to deal with the introduction of a second switch. For some Learners, activation of a second switch may be a physical (or cognitive) impossibility. However, as a second switch may eventually become a 'selection switch' (The main switch will move through a range of options: each activation moving to the next highlighting each choice on the way; while the selection switch will be used less frequently to say 'I have finished. I choose this one.'), we can select a position for the switch that the Learner can reach with any part of their body at leisure as there will be no time consideration involved. While it is generally our opinion that the use of a two switch step-scan is 'easier' than single-switch automated-scanning, there are exceptions:

- if there is absolutely no chance of a Learner's use of a second switch in any position then, remain with a single switch and move to automated scanning.
- some Learners find the use of a step scanning approach extremely fatiguing. The requirement to hit the 'scanning' switch repeatedly (with any part of the body) can be a step too far. Automatic scanning cuts activations dramatically and therefore reduces the physical demands on the Learner.
- some Learners may find swapping scanning patterns/methodologies confusing.
- timing the access to a POLE using both one and two switch scanning systems demonstrates that the learner is actually quicker using a single switch approach.
- the Learner prefers one switch: Learner choice.

No doubt, some will disagree but, generally, it is our belief that two-switch, step-scanning is easier and, normally, more accurate than single-switch, automated-scanning (although, as already stated, there are exceptions) for some learners. As it is our belief that a two-switch step-scan can be an easier task than a single-switch automatic-scan for some Learners, the Learner needs to be given the opportunity to experience two new skills: second switch use and scanning awareness and ability.

The 'Null Switch' approach is, perhaps, the best way to introduce a second switch. The Switch Rules (See Appendix One) inform us that it is good practice to label all switches with an appropriate symbol. The Learner's initial switch (Switch One) should already be carrying a suitable POLE symbol. We now introduce a second 'Null Switch'. A Null Switch is a switch that doesn't do anything because it is not connected to any device. The switch can be completely different to Switch One in its shape, size and colour. These are the stages of introduction for the Null Switch:

A   The Null Switch carries no symbol and is placed on the periphery of the Learner's personal switch space such that the Learner appears aware of the switch but it doesn't interfere with the Learner's use of Switch One.
B   The Null Switch is gradually moved into the Learner's switch space so that it becomes a distracter. However, as the Null switch performs no function, the Learner comes to understand that the labelled switch (switch one) is the switch that provides the POLE event.
C   The Null Switch replaces Switch One and takes its position. Switch One moves to one side. Does the Learner activate the Null Switch (no reward) or continue to access Switch One which provides the POLE event?
D   The Null Switch is now symbolized! It carries a Null symbol: a symbol that means 'this

switch does nothing. Don't bother with it!' (a red **X** for example). The Learner has to discriminate between the two switches: which is Switch One? If the two switches are visually distinct then the task is easier (a blue and a green switch, for example).

E   The Null Switch is changed, attribute by attribute, such that it approaches Switch One in size, shape, colour and style. Eventually, the only item that should differentiate the switches is the symbol they carry. Switch One carries the POLE symbol and the Null Switch carries the Null Symbol.

F   The Null Switch and Switch One are interchanged (position) at random. Does the Learner activate the switch carrying the POLE symbol (the active switch) or is s/he confused by the Null Switch? If the Learner is activating Switch One, as the only indicator of activity is the POLE symbol, the Learner must be discriminating by symbol alone. Symbol recognition and discrimination is an extremely important factor in future development. The Learner has made a significant step forward.

A variation on this approach is to attach the Null Switch to something unmotivating or negatively reinforcing.

If the Learner is confused at any stage, move back to the preceding stage and slow down the progress between the two stages such that the Learner has more time to figure out and come to terms with what is happening.

Objective 13: The Learner will ignore a Null Switch placed on the periphery of the Learner's personal switch space.
Objective 14: The Learner will ignore a Null Switch as it approaches the position of the active switch.
Objective 15: The Learner will continue to operate the active switch when it is moved from its normal position.
Objective 16: Given the choice of both symbolised Active and Null switches, the Learner will continue to operate the Active Switch.

7   Choices with switches

Making choices between two (or more) items with switches can be achieved in (at least) three ways:
-        one switch leading directly to each item/option;
-        one switch that activates a scanning choice to select from an array of items/options;
-        two switches that activate a scanning choice to select from an array of items/options;

What are some of the reasons for making a choice with switches?
-        to identify Learner cognition;
-        to provide control experiences for the Learner;
-        to provide a choice of options for the Learner.

Consider the following scenario:

-        Two activities are set up such that they can be activated by two separate labelled switches. Switch One (attached to a Truck) and Switch Two (attached to a Food Blender).
-        A teacher asks our Learner to choose a preferred activity.
-        The Learner activates Switch One and the Truck moves.

What do we understand by this action?

A   The Learner has chosen to work with the truck.
B   The Learner is capable of making choices.
C   The Learner has cause and effect skills.
D   All of the above.
E   None of the above.

Can we assume that the Learner has chosen to work with the truck? No we cannot!

-        Switch One may be placed on the Learner's right side and the Learner, being right handed, always activates the right switch first. Switch One is easier to hit than Switch Two.
-        The Learner may have intended to activate Switch Two but did not have the physical control and accidentally activated Switch One.
-        Switch One is red and Switch Two is blue. The Learner finds red more appealing than blue.
-        The teacher looked at the truck as she asked the question. The Learner doesn't understand the teacher's words but activates the switch s/he believes the teacher intends.
-        The Learner finds the truck's colour more appealing
-        Alternatively, …

The Learner may indeed have chosen to work with the truck but we cannot know this from this one action.

Can we assume that the Learner is capable of making choices? No we cannot! Simply because a Learner activates a switch does not mean that s/he has made a conscious choice. It only means

that the Learner was able to activate one switch out of two. Neither does repeating the task demonstrate choice making even if the Learner activates the other switch this time. No amount of demonstrations in this manner will confirm conscious choice making:
- The 'choice' could be completely random;
- The activation could be dictated by the physical status of the Learner at that time;
- The Learner could be activating switches for a different reason than that stated; more attractive colour, teacher pointed at it, it was nearer …

Can we assume the Learner has cause and effect skills? After all, s/he activated a switch and moved the truck. No, we cannot! Simply because a Learner hits a switch placed in front of him/her within easy reach, it does not follow that s/he understands that the switch causes a POLE event.
- The Learner may have been attracted by the colour of the switch;
- The Learner may play with anything that is placed in his/her reach;
- The Learner saw the teacher point to the switch and reached out for it;
- The Learner was moving his/her arm and accidentally activated the switch.

Therefore the answer to the original question was 'E'; none of the above. We cannot assume any of the items listed to be true and we should not make claims for such an action without additional evidence. What can we claim? Is there a way of knowing that the Learner has made a conscious choice if s/he cannot vocalise?

We can claim that, through repetitions of this type of choice provision, the Learner may come to understand <u>what is selected is what is provided</u>.

We can prove (to a reasonable level of certainty) that a Learner is making a conscious choice if we ask a question to which we know the answer in a manner that doesn't give unintentional cues to the Learner:
- Sam had orange squash at break. He has a different drink most breaks.
- There was a choice of three drinks: orange, apple and blackcurrant.
- A person (who doesn't know what Sam had to drink) asks Sam what drink he had at break.
- Sam (scans and) selects orange.
- The questioner tells the teacher who confirms that Sam had orange.
- This is repeated over several days.
- Sam is always correct in informing us of what he had to drink.

However, it may be that:

- Sam has the same drink (orange squash) every break.
- Sam thinks he is being asked to choose another drink (future - for an additional break) and does not comprehend that we are asking him to state what he had previously (past).

If Sam has orange squash every break and he chooses orange when we question him after break, what can we deduce? It could be that he is simply indicating that he **wants** another orange; not what he had for break. However, we can say that he is very likely to be operating the switches

with understanding as he is selecting 'orange' every time and not making a mistake and selecting one of the other choices.

If:
- Sam had Apple juice at break and;
- Sam chooses Blackcurrant in our test and;
- the staff simply rationalize that choice as 'Oh Sam thinks we are providing a choice of drink and he's choosing blackcurrant'

… then no progress is made. The test is not proving or disproving anything.
However, if, in this scenario:
- Sam varies his drink choice from break to break and;
- correctly identifies his drink post-break, each time he is questioned;

We can start to assume that Sam:
- is capable of making a choice as he is consistently providing us with evidence of understanding;
- has cause and effect as this action is a higher order cognitive process;
- is capable of understanding and using the provided switch system.

Objective 17: The Learner will select the correct response from a choice of two when working with a 'blind' facilitator over X days.
Objective 18: The Learner will select the correct response from a choice of three when working with a 'blind' facilitator over X days.
Objective 19: The Learner will select the correct response from a choice of four when working with a 'blind' facilitator over X days.

8 Scanning

Researchers and clinicians, as well as users, all agree that scanning is a complex task involving a variety of components, including motor, visual-perceptual, cognitive, and linguistic skills (RATCLIFF A. 1994)

Overall, the results of this study confirm the clinical practice of minimizing the cognitive, visual, and communicative demands on the initial trial tasks in assessing scanning access for AAC system use. This may mean using tasks and equipment other than the actual AAC equipment. (RATCLIFF A. 1994)

Scanning has to be taught. It is likely that the skills necessary will have to be progressed over time although some individuals may be able to 'jump in at the deep end'. Communication devices, environmental control systems, and computer access (through an on-screen keyboard) will all require advanced scanning skills. The nature of the skills required will be governed by the cognitive and physical abilities of the Learner. Therefore, the goal is to teach the required skills in a staged approach starting simply and moving forward, slowly, one step at a time.

Earlier, the section on timing looked at some simple applications of scanning. Some of that section is repeated below and taken further.

As we have seen, scanning can begin without the use of a switch or any electronic system: we can present items in a scanning fashion to provide a Learner choice. Initially, perhaps, a single item presentation scan …

Apple (hide apple), Orange (hide orange), Banana (hide Banana), Apple …

Stepping one pace forward to a multi-presentation scan…
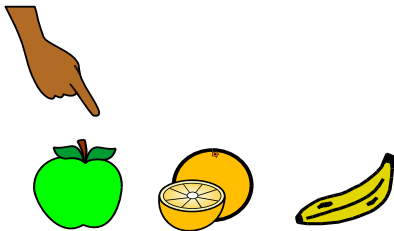
Apple, Orange, and Banana (on table top)
Point to each in turn saying 'Do you want Apple (Orange, Banana)'
Vary length of time on each according to need of Learner.

We need to note if the Learner is visually tracking our movements: an important and necessary skill for most scanning systems. If the Learner does not track, or fails to perform in any way, the reason for the failure must be ascertained and addressed before any further progression is attempted. It may be that pointing to each item is not sufficient a cue for the Learner: we may need to highlight each item with a torch (or in some other way) to help the Learner follow our movements and the location of the scan. Objectives for visual tracking have not been included. However, they may form a necessary part of skill set required for successful switch use and may be addressed separately. In the same way, other sensory and cognitive deficits have not been addressed but may impede progress in some manner. Each problem area must be addressed

before attempting further progress. For example, symbol awareness may be an issue for some Learners.

The next stage is to introduce a switch to control the scan. Begin with a simple PowerPoint scan: each activation of the switch moves to a new slide and each new slide depicts something that the Learner loves, combining music and pictures and even video. A few slides should be boring however. The purpose of this is in the observation of the Learner's use of the switch. Does the Learner access the switch quickly on the boring slides to move it on to something more exciting? Does the Learner remain on the exciting slides for longer? This would suggest an excellent grasp of switch use.

Following this, introduce some simple scanning system such as the FL4SH from AbleNet (or the 4Talk4 from P&G). Leaving all but one cell blank, Task the Learner to activate the switch on the target cell (ensure the target cell operates some motivating reward for the Learner's achievement).

Gradually increasing the number of symbols on the FL4SH or the 4Talk4 makes the task a little more complex and, as such, demands more of the Learner. We can progress the Learner from a choice of one out of one (other areas blank) to a choice of one from four (all locations symbolized).

Generally speaking, after a simple linear scan we might move to a simple Row/Column scan of perhaps two or three rows. Again, this can be practised away from switches and computers. Consider the following task: Where is the apple?

It is in row two. We can point to each row and ask 'Is the apple in this row?' Then we can scan the chosen row. We are teaching scanning skills without any switch or any device: just a few symbols or pictures. We can play games with such grids of symbols. We can play battleships which is a game of rows and columns. We can play Connect Four. In this and other simple ways, it is possible to begin the introduction of rows and columns away from the switch and the scan.

Scan patterns have not yet been mentioned. In English, we read from the top down and from left to right. Most scan patterns follow this same pattern. However, it does not have to be thus and we should not assume that the Learner thinks and works in this way. If this is the chosen scan pattern then we should ensure that work with the Learner both teaches and reinforces this approach. In the 'apple' example above, the facilitator should always begin with top row and cycle down and up until a selection of row is made. Then move from left to right along the chosen row.

One way of teaching a scan pattern and highlighting the part of the scan on which you want the learner to focus is to make a set of highlighter masks. These are basically:

- a coloured cardboard rectangle with a 'window' to highlight the row being scanned.
- a coloured cardboard square with a window to highlight each item in the selected row.

The colour chosen for the card should ideally be the colour of any future scan on any future system. How will you know? Make an educated guess! Most systems are likely to have the basic primary colours as scanning options. Don't use white or black card! Red, green and blue are safe bets.
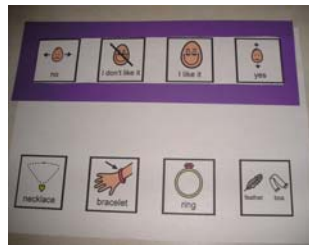
We now need to move this skill to the computer or a device so as to allow the user to practice it in real time on an external system. Clicker 5 (from Crick Software) (example screen shot left) offers one choice for such an activity on the computer. While it is possible to set up such an activity within PowerPoint, it is more complex.

There are a range of AAC devices that offer 8 locations with scan: Liberator offers a number of such systems. The least expensive is the SpringBoard Lite System pictured on the right (shown in 32 location). As the SpringBoard has a dynamic screen the number of cells can be varied and thus, the Learner can be tasked with a greater challenge on mastery of the 8 location scan.

With both Clicker and SpringBoard (as well as other systems) the number of displayed cells (symbols), as well as their configuration, can be varied. Thus, the Learner can be tasked, from within the same program or device, with a slightly more challenging scan, once mastery of the prior scan has been achieved. There will come a point, however, when a maximum level is reached; either for the Learner or for the capabilities of the system. If one goal for the Learner is fast and effective communication then (generally speaking), the more locations available, the more speedy and powerful the system. If language is squeezed into a lesser number of locations then you have to have less language or more activations per item of vocabulary output.

It should be noted that working with switches, scanning, and selecting symbol sequences is both a physically and cognitively challenging task and, as such, will come later in the development of skills for the Learner. Scanning at 8 locations then should begin simpler with perhaps scans to specific locations perhaps to play a tune or achieve some other motivating reward (ask for a sweet for example!).

Objective 20: The Learner will select the 'correct' response from a 6-location (2x3) grid when working with a 'blind' facilitator.
Objective 21: The Learner will select the 'correct' response from an 8-location (2x4) grid when working with a 'blind' facilitator.
Objective 22: The Learner will select the correct symbol from his 8 location system when working with a 'blind' facilitator.

Note: No mention has yet been made of auditory scanning in this paper. As its name implies, auditory scanning provides an additional auditory element to the scan. Each item that is scanned on a selected row (for example) can be named as it is scanned. Most auditory scans allow customization such that (for example) a different voice may be used for the scan to that used for any spoken output.

Switch Grading

Area	Grade	Date	Achieved	Notes
Switch Awareness and Interaction	1			
Looks at switch	1a			
Tolerates switch	1b			
Reaches for switch	1c			
Touches switch	1d			
Switch Access and Activation	2			
Activates a switch connected to a POLE	2a			
Remove hand from switch after activation	2b			
Activates the switch once for each POLE event	2c			
Cause and Effect	3			
Activates switch on POLE termination	3a			
Ceases attempts to activate switch on POLE event	3b			
Uses switch with different POLE events	3c			
Uses switch in different environments	3d			
Timing Actions	4			
Activates switch on verbal prompt	4a			
Makes selection from automated scan	4b			
Anticipates POLE event	4c			Plays space invaders
Second Switch	5			
Ignores Null on periphery of personal space	5a			
Ignores Null within personal space	5b			
Ignores Null in active switch position	5c			
Discriminates between null and active switches	5d			Cues present
Discriminates between Null and active symbols	5e			No other cues present
Simple Scanning	6			
Correct selection from choice of two	6a			
Correct selection from choice of three	6b			
Correct selection from choice of four	6c			
Complex Scanning	7			
Plays game using a grid	7a			Os & Xs, Connect Four, Battleship …
Correct selection of symbol from a 2x3 grid	7b			
Correct selection of a symbol from a 2x4 grid	7c			
Correct selection from electronic grid scan	7d			

Objectives

Objective 01:   The Learner will look at the switch when it is presented.

Objective 02:   The Learner will tolerate the switch in his/her personal space.

Objective 03:   The Learner will reach out and attempt to touch the switch;

Objective 04:   The Learner is able to activate the switch (to create an effect).

Objective 05:   The Learner will remove his/her hand (other) from the switch after activation is made.

Objective 06:   The Learner will activate the switch once for each POLE event.

Objective 07:   The Learner activates the switch only when the POLE event has terminated.

Objective 08:   The Learner continues in the attempt to reach the switch and then ceases when the switch is activated and the POLE event is enabled.

Objective 09:   The Learner demonstrates awareness of Cause and Effect consistently over X days, in Y environments with Z different POLE Events.

Objective 10:   The Learner will activates the switch within X seconds of being instructed by a Significant Other

Objective 11:   The Learner will activate the switch appropriately in response to an automatic scanning mechanism (to indicate a blind choice)

Objective 12:   The Learner will operate the switch in response to and anticipation of a POLE event.

Objective 13:   The Learner will ignore a Null Switch placed on the periphery of the Learner's personal switch space.

Objective 14:   The Learner will ignore a Null Switch as it approaches the position of the active switch.

Objective 15:   The Learner will continue to operate the active switch when it is moved from its normal position.

Objective 16:   Given the choice of both symbolised Active and Null switches, the Learner will continue to operate the Active Switch.

Objective 17:   The Learner will select the correct response from a choice of two when working with a 'blind' facilitator over X days.

Objective 18:   The Learner will select the correct response from a choice of three when working with a 'blind' facilitator over X days.

Objective 19:   The Learner will select the correct response from a choice of four when working with a 'blind' facilitator over X days.

Objective 20:   The Learner will select the 'correct' response from a 6-location (2x3) grid when working with a 'blind' facilitator.

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Objective 22:   The Learner will select the correct symbol from his 8 location system when working with a 'blind' facilitator.

9   Switching For Staff – Good Practice in the classroom and beyond

If children don't learn the way we teach,
We must strive to teach the way they learn.

Thus far, we have concentrated on helping the Learner to develop the necessary switching skills to be able to be in control of his or environment. However, we have neglected to mention a very important factor: establishment/staff attitude, expectations and practice!

An initial point, which we must all acknowledge, is the fundamental right of the switch user to be included in all that happens in the classroom. In 2001, the Special Educational Needs and Disability Act changed the 1995 Disability Discrimination Act to be inclusive of schools and colleges. Thus it became unlawful to discriminate against a Learner experiencing a disability in all aspects of school life without proper justification. Thus, real inclusion has taken yet another step forward.

However, inclusion does NOT equate with integration. They are not synonymous:

"We seem to use integration and inclusion as synonymous. This is not helpful and it would be useful is we could agree what we mean by each of these." (http://www.diseed.org.uk)

Indeed, integration can mean further segregation: the child integrated into a place where s/he is not accepted and included can feel more segregated than the child who was not integrated. While we might be integrated into a whole series of lectures by Stephen Hawking, the authors would undoubted feel lost with the level of knowledge required to participate; therefore, we would be integrated but not included. To be included, the tutor, and the rest of the class would have to change their practice. Simply providing an additional (part-time) member of staff to work alongside the authors in the series of lectures and 'translate' Stephen's language into the 'English' that we might understand is insufficient and **not** inclusion.

Integration + Translation   ≠   Inclusion

Including the Learner (who happens to use a switch or switches to participate) may be daunting for many staff. Even in 'specialist' establishments, the switch user may still be marginalised and under tasked or segregated. Staff may find the Learner very challenging: they may find that s/he:

-    is at a completely different level to the rest of the class;
-    does not understand staff communication;
-    uses equipment with which they are unfamiliar;
-    requires additional help from other specialist staff which means that they miss significant parts of lessons;
-    is too slow and holds up the progression of the others in the class;
-    finds the level of work inappropriate and is constantly failing to achieve;
-    cannot use his/her communication system to answer class questions;
-    begins to behave in a challenging fashion after a short period in the group.

On the other hand, staff might naively claim that the Learner is understanding and following all that is happening within the class when in fact most it is flying over the Learner's head at an incredible rate! The supporting member of staff (LSA) is the one who is, in fact, completing most of the work on the Learner's part, for which the Learner is being credited.

All scenarios are clearly unacceptable and none is inclusive.

Generally speaking, teaching staff at all levels are already fully tasked with work. They work long hours and put in a great deal of effort to deliver the school curriculum. Therefore, the suggestions that follow obey the '30 Second Rule'; that is, they can be delivered in thirty seconds or less by almost any member of staff. While some may take a little longer to prepare, once preparation is complete – the materials can be used again and again. They should take no longer than 30 seconds to implement. They can (and should) be used with the whole class such that the Learner is included as a part of the 'system' of the classroom and does not feel that 'special' measures are being adopted on his or her part (and only on his or her part). Such 'special measures' may, in fact, mark the Learner as different from the other children and set him/her apart in an alternative form of segregation.

Several studies show the benefit (for both those with and without disabilities) of the integration of Learners experiencing severe disabilities into general education settings particularly in relation to the social aspects of learning (acceptance, self-esteem, and social skills) (see for example - Kennedy, Shukla, & Fryxell, 1997; Mu, Siegel, & Allinder, 2000). Although some studies indicate academic gains, generally, teachers find the inclusion of Learners with severe disabilities in the 'academic' curriculum much more challenging (Heller, 2001). The authors' classroom experience reinforces this notion. Staff is often unable to articulate why Learners are using switches in a particular way or why the Learner is performing a particular task with a switch (making a toy move for example). In some instances, Learners have been observed following what appear to be completely distinct activities to the rest of their peers in the class and, on many occasions, have been removed to a separate section of the school or college. Learners may spend an inappropriate amount of time on variations of a basic activity (making the dog walk to making the cat sing) because staff are unsure how to proceed.

Not all the suggestions that follow will work in every classroom on every occasion; readers must feel free to pick the ones that make sense to them and adapt them for their own needs. If there are other didactic approaches that are not covered, the authors will gratefully accept (acknowledge and disseminate) any further suggestions received for other successful practices.

Staff awareness

Some staff has never experienced using the equipment utilised by their Learners. Sometimes there is only one of such items and that belongs to the Learner and is unavailable to staff. How can one have real empathy for a person when you have never walked a 'mile in his/her shoes'? Staff should have real experiences of what daily life is like for such a Learner so that they can better prepare for their presence in the class and for successful inclusion and education.

Success is not about having the latest, the best, and the most expensive technology. If it were, the solution would be easy. More success can be achieved with limited access to technology via staff with a positive and consistent attitude and excellent working practices than visa versa. That is not to say technology does not have its part to play and cannot help ameliorate an otherwise difficult situation. Technology is important and should not be overlooked. Good staff awareness together with good practice and excellent technology is a recipe for success.

There is no substitute for regular training from professionals who know their subject. Finding such professionals may not be that easy but they are out there. Most would be willing to give advice to individual staff members from time to time when staff are experiencing frustrations with the sessions they have prepared.

Terminology

... the terminology we choose for referring to individuals with severe communication impairments can shape our attitudes and those of others regarding those individuals. (MUSSELWHITE C. R. 1987)

The latest politically correct terminology is an ever-evolving field of potential study: when does it change? How does it change? And, perhaps, more importantly, why does it change? However, granting that whatever we say about correct terminology now will be incorrect by the time you read this paper, we still believe that the things we say and the way that we say them can not only be *not* inclusive but also hurtful.

Fire will Burn	**Shattering Syllables**	**They will Shatter you Soul**	**Fire will Burn**
Sharp axes can Hack	**Can Slice through you Ears**	**Push you to Death**	**Sharp axes can Hack**
But none are so Lethal	**Sever your Heart**	**Those Poisonous Sounds**	**But remember the pain**
As the Verbal Attack	**Nurture your Fears**	**In each Killer Breath**	**Of your Verbal Attack**

Kate Preece 1996

It is the authors' opinion that there is no need for specialist vocabulary when addressing Learners experiencing physical disabilities and or learning difficulties as long as staff relate to them as people first. We should no more shout, use distinct vocabularies, gesticulate, or communicate in any special way distinct to the way we would communicate with any other member of the group. For what is good for John will also ease the way for John's peers too. For example, if you sign to Jenny then you should sign to Justin and Julia and … Indeed, its only by using sign everyday that both staff and peers learn the use of sign and, it's only in learning the use of sign that includes those that require its use (to aid understanding) in all that we do. In same the same way, we should utilise a symbol system for the benefit of all. It won't slow things down; it won't make things more difficult: indeed, you will find that it aids the understanding of all. Which symbol system? We would hesitate to recommend one above another: there are over 40 symbol systems commercially available for AAC alone (Augmentative and Alternative Communication). Whichever is selected it should be utilised for the benefit of all the students in the classroom and not just for a specific individual (marking him/her as distinct). For example, symbol boards and Clicker grids can be utilised to benefit all children across the curriculum.

<u>Walls are not boundaries</u>

Education does not stop at the wall of any particular classroom; it extends beyond walls and pervades every aspect of that school. It extends beyond the school to pervade every aspect of the community which, of course, is inclusive of parents and carers. We must share our practice and our success and failures with all Significant Others (parents, carers, social workers, key workers , …) involved. They too must be included for the experience to be called 'inclusive'. A home-school diary is one way of doing this. A Learner Diary is another. How does a Learner Diary differ from a home-school diary? A home-school diary tends to be a messaging system between school and varying Significant Others (notably parents) with very little involvement (inclusion?) of the Learner him or herself. A Learner Diary however, is a record of the events of the day presented in a medium that is meaningful to the Learner. For each session of the day (perhaps towards the end of the session) the Leaner is assisted (where necessary) to fill in his/her diary with an example of what s/he has been doing in the session. This may only include written text where the Learner is literate and is able to make the entry him/herself. Generally, it will include an item produced in the session (or part of an item produced in the session) or an item that came out of the session that would normally be discarded. Such items are glued into the appropriate position in the Learner's diary by the Learner (with assistance where necessary). Still uncertain about a Learner diary? Consider the following examples:

- During a painting session the teacher gave Sally a small 3 x 3 piece of paper on which she could use the colours that she had used in her painting. The idea was not to make a smaller reproduction of a larger work but to act as a reminder of the work she had done in that particular lesson. Sally stuck the paper reminder in her diary. The teacher annotated the diary 'Sally painted today'. The teacher did not say what Sally painted: that was for Sally to remember and inform Significant Others looking at the diary entry later.

- After a trip to the supermarket, staff helped David 'recycle' his plastic supermarket bag by assisting his pasting its supermarket logo into his diary. For good measure, David also included the wrapper from an item he had purchased independently.

- Rian had 'played' a space invader game during an I.T. session. The aim was to improve her switch coordination and timing in a fun and exciting way. Staff had created a screen capture which was shrunk in size and printed out for Rian to add to her diary.

- Matthew had been on a train and a bus as a part of independence studies. Matthew glued his train and bus tickets into his diary.

- Jenny had spent a session taking turns singing lines from a favourite song using a Step by Step device together with a member of staff. A digital photo of them working together was included in the diary.

The Diary travels with the Learner. It is the Learner's diary. Significant others are encouraged to assist the Learner to complete it for evenings out of school and weekends and holidays. In this way, Learners build a picture of their world; a historical record of what has been in a medium that is meaningful. The study of history (for a Learner experiencing severe learning difficulties) might

begin with such a personal record. Furthermore, future events, such as the school disco, can be placed in context: the ticket can be attached to diary in the correct position so that the Learner gets a 'feel' for how far away it is.

The home-school diary and the Learner diary are but two ways of many of extending the learning experience beyond the school walls and involving all Significant Others.

Organising the environment

Have you ever tried to take a pram or a pushchair around a busy shop? Generally speaking they are not designed for such an intrusion and yet, if they were, would it be a disadvantage to the rest of us? Ever had a problem getting about due to an injury and struggled with a set of steps? We suggest that far from being a disadvantage, that most of us would actually prefer the space and freedom of movement that was the result of a change in the layout of a busy shop or alternate access via a ramp rather than steps. Likewise, manipulating the classroom environment for the needs of people in wheelchairs or with problems or mobility can make the classroom better for all. Gently sloping ramps instead of steps do not handicap the ambulant in any way but make buildings more accessible for those who are not ambulant. Indeed, the design of the environment should try to take away the need for the 'special' and make everything available (inclusive) to all …

"That's fine, in theory, but I have thirty two children in my class, thirty four if you count Julia's Classroom Assistant and myself. How are we supposed to organise it so that there is space for a wheelchair to move around?"

We admit that not all classrooms are suited to wheelchair use and that some class sizes are better than others. However, we are not suggesting complete freedom of movement, merely an organisation that takes into account, and better suits, wheelchairs. If space is an issue because of enlarged class sizes (or just small classrooms) then it should be addressed at management level: failure so to do may result in criticism at the time of inspection. Integration without resources (and one resource is the necessary space) is not inclusion but rather tokenism.

"Ah but we need a special computer for Jonathon"

Why do you need a special computer for Jon? Why can't he use any computer in the classroom? He has special access equipment? Modern equipment is usually not very bulky and simply plugs into any available USB port (and it's really easy to make USB ports accessible on every computer). It's a bit more bulky than that? Then put it on a mobile rise and fall table so it can be easily used on any computer. He needs special software? Isn't all the software on the network accessible by any computer? If not, why not? The issue here is not really a special computer for Jon but marking Jon out as 'special'. If there is a special computer for Jon then there ought to be a special computer for every member of the class. If they have to share, then so should Jon. There may be scenarios where Jon is limited to the use of one computer but every effort should have been made to try to avoid this.

"Actually, Julia requires a lot of specialist equipment and materials."

That may be so, however why would that affect the design of the classroom, as long as things are organised and accessible. Rather than having special materials just for Julia, we would suggest that you use those very materials for all the class. Sign and symbols can be used across the curriculum with all. Keep the range of special materials that are used just for the tuition of Julia to the minimum. Indeed, try and eliminate them altogether.

Little Things Matter

How many 'F's are there in the sentence below?

"Finished Files are the Result
of Years of Scientific
Study Combined with the
Experience of Many Years"

What did you get? Did you get one, two, three, or something else?

Come on, admit it … what the majority of people say when asked the question is three, overlooking the two occurrences of the word 'of' in the sentence taking the tally to five! We naturally overlook the little things – they don't matter, do they? Actually, yes they do! The answer is completely different when we don't overlook them. Having made the point, hopefully, the issues below will become more cogent.

What are the little things? Such things as the correct colour of switch, in the correct position, correctly labelled. Any switch, in 'approximately the right position', and it 'doesn't need to be labelled: Julia knows what it is used for' is completely the wrong attitude.

More little things? The ways in which staff interact with Learners, are important:

- Say the Learner's name first to get their attention: "Julie, stop what you are doing."
- Provide time for the Learner to process information.
- Do not rephrase questions if you believe that the Learner hasn't understood as it may be consider as yet another question and cause further confusion.
- Use short and simple language, avoiding such things as metaphors (pull your socks up), irony, jokes, etc as these may be taken literally and misconstrued. However, this does not mean that staff should 'talk down' to learners or be patronizing.
- Assisting the learning of new vocabulary (or old vocabulary used in a new way) through the creation of Learner dictionaries (for example) in which words are matched with symbols and or pictures.
- Support your language with other modalities. For example, supporting language with models, photographs, pictures, drawings and/or symbols.
- Don't be tempted to finish a Learner's sentence for them even if they are very slow if they haven't given you permission. Don't make the rest of the class wait while the Learner prepares a response – it adds extra stress for all.

- Providing choices.
- Knowing when to step in and assist and knowing when to step back and allow the Learner to lead.
- Using alternatives to written reports for Learners who are presently non-literate. That is not to say that we give up on the development of literacy skills. Some communication devices will link to computers and may be able to produce written text.
- Communicate at the Learner's level when possible, it is easier and less threatening. Some learners (notably those with ASD) may find eye contact problematic.
- Respect all Learner communication.

There is no claim that the above list is comprehensive.

All for One and One for All

Inclusion means just that: the Learner is included in everything and not segregated or excluded. If others members of the class are given chores and responsibilities so should our Learner. How can Jenny be involved in caring for the class pets when she is severely disabled? One has to think creatively and laterally: Jenny could feed the fish for example – a switch could operate a moving vehicle or animal which could topple a hinged container which drops the correct amount of food into the fish tank. Sure, someone has to place the food in the container each time but Jenny has the responsibility for the food delivery. What if Jenny forgets? What would you do if any other member of the class forgot? Then do exactly the same: simply because Jenny has a disability does not disbar her from responsibility.

Sam cannot join in every Physical Activity session? There will be some activities in which the Learner will find it very difficult to participate. However, it should not be assumed that inclusion means competing at the same level with the same goals, targets and objectives for everyone. Sam's goals, targets, and objectives will be individual, different to peers in the class. Sam should not be excluded from P.E. and, in some sessions, might be included by being placed in control! For example, in a particular session, the children play a game where they are required to move around to music and then be completely stationary when the music stops. Sam's body is always moving and Sam finds it impossible to be stationary. If the tutor ignores this, the other children complain, saying that it is unfair, as well they might. Sam is put in control of the activity. It is Sam's responsibility to switch on and switch off the music at random intervals. Staff are freed to observe and judge the game.

Co-operation

Get students to spend some part of the day or session working in small diverse teams: advanced learners with those that are not so advanced, mixing able learners with those that are not so able. These diverse groups/teams are then tasked to learn a particular theme or topic or undertake a particular task which involves learning. The teams are informed that if one member of the team fails then the whole team fail, they are to help each other with the work, with learning and understanding.

There are various approaches to cooperation; one is known as 'jig-sawing'. In jig-sawing, each member of the team learns a different piece of the task and then comes and reports back to the group to teach his/her section to the others. The others can ask questions, for clarification, additional information, etc, until they are sure that they, too, have understood the section. The whole group has to report back to the teacher once the task has been completed. Several diverse groups could be working on the same task, eventually sharing knowledge and learning at the end of the session. Learners have to:

- work as a team and include all others.
- help others, especially those who have learning difficulties.
- learn about others needs and abilities and problems, empathise with others.
- make information comprehensible so that it may be understood by peers.
- share goals, act responsibly.

Peer Partnering

Peer partnering is a technique for answering questions that, used sensitively and wisely, can assist Learners to respond to tutor questions without holding up the rest of the class. Students are paired (diverse pairing) and each pair is given a question on the session that they have to discuss and on which they have to prepare an answer. The answer must be given by both members of the pairing equally and not just a single member (although they are allowed to help each other). Thus, the class is provided with a set of questions and is given time to prepare their responses. As it is known that both members of the pairing have to provide an equal amount of the 'answer', the more able partner cannot simply do all the work on his/her own but must work with their peer as a team. The Learner has time to prepare an answer and is not simply put on the spot while the others in the class are waiting for him/her to 'build' an answer.

Pairs are not fixed! They are different every time so that all individuals get to work with all others.

Why Switching?

All staff should be able to explain why a particular Learner is using a switch to make a dog walk and bark (for example). Staff should be able to state the objective, the target, and the future goal. Staff should not be saying (when asked), "err I don't know". There is a point to working with the yapping dog and it is not to teach the Learner that dogs yap or indeed anything about dogs. The point is (normally) one of understanding cause and effect or developing switch access skills. Once mastered, the Learner should be moving forward (not laterally onto the meowing cat) and not stagnating forever on switching on a toy when it stops.

Temporarily Restricted Vocabularies

The second vocabulary and language barrier relates to "verbal" classroom participation. All students, at all grade levels, are asked questions, ask questions of others, take oral examinations, and are called upon to recite information. In some classrooms, even shy students who speak cannot get a word in edgewise. For augmented communicators, the possibilities of well-timed speaking is even more remote. The pace of verbal exchanges is too fast to allow even the most efficient student using AAC to participate. (VAN TATENHOVE G. & VERTZ S. 1993 page 129)

A TRV (*Temporarily Restricted Vocabulary*)(pronounced TREV) is a *small* subset of the vocabulary contained within *any* person=s communication system. It allows a beginner to be involved in an activity on an equal footing with peers.

A TRV may be set up to include phrases:

"That=s right!" "That=s wrong!"   "I need to think about it" "I don't know"

The class is told that they must use one of these phrases in response to the teacher=s questions in the session that will follow. For example, the Maths teacher might say:

"If I am facing south and I turn two right angles clockwise, I am now facing north."

All the pupils have to respond with one of the messages when asked a question. Learners using a communication system can usually access one of the responses in real time on a level footing with their verbal peers for their system is set so that the only things that appear are the four possible answers. No communication aid? Simple! Make up an answer sheet containing the four possible answers as symbol choices. The Learner chooses one from four – indeed, all the class work from a copy of the same answer sheet. There is no difference! The symbolized answer sheet takes time to construct? Yes, but once saved to computer disk it can be used again and again in future sessions, altered and adapted to create new TRVs so that, eventually, staff have their own TRV library. There is a further benefit. The messages are a useful addition to the Learner=s vocabulary. They may be used in other lessons and other situations they may encounter:

"Jane you=re 14 now, aren't you?"   *"That's right"*

Other TRV=s might include:

>I agree=   >I don=t agree=   >I=m not sure=   >I don=t know=
>True=   >False   >Sometimes=

TRV=s can be noun sets. For example, a set of materials:

>wood=, >metal=, >glass=, >paper=, >plastic'

In this instance, the response required is one of the given materials:

Which material is transparent?
Which material is used to make books?
Which material is made from sand?
Which material is not man-made?

The material set is taught and reinforced in this way.

In all session preparation and indeed in all IEP and schemes of work, reference should be made to the Salient Vocabulary Items (SVI) that the session intends to address: that is the key concepts

Stop that silly crying at once boy. Jones & King say your vocabulary should be restricted, so I have made this Communicatively Restricted Augmented Pointer. You'll be able to communicate more effectively now. OK, are you willing to do all my washing for me today?

the teacher wants the pupils/students to learn. There probably won't be a huge number of these in any lesson, for each will need explaining with practical examples and illustrations. Once the session's SVIs are known, staff can test for understanding and comprehension using the TRV approach, thus ensuring what has been taught equates with what has been learnt.

What is the session about?
What do I expect the pupils to Learn?
What vocabulary is salient for this learning?
Can I make (and save) a TRV symbol chart(s) of this vocabulary to use to test for Learner comprehension?
What are the questions that I can ask of the pupils in the class for which one of the TRVs is the answer?
What vocabulary will be functional and useful for future situations?

Some questions can be addressed to the whole class to which they have to write down their answers for later marking. Some questions can be addressed to individual Learners but don't always select the Learner using switches, (for that would be marking out as different in some way) just occasionally, as you would with any other member of the group.

In the cartoon the TRV is not valid: The Learner can only say one word and that is 'YES'. TRVs should always be a minimum of two words or phrases. If a person is tested for comprehension, the larger the TRV the less opportunity of obtaining a right answer by chance alone. At the other extreme, there is a limit to the size of any TRV. Too big a set becomes a sub-vocabulary or a category in its own right and does not allow a user to interact with peers on an equal footing in a classroom interchange. Ideally, a TRV is more than one but less than seven.

A TRV could be set up to give directions to a staff member in a treasure trail game or a game of hide and seek. For example:

Right, Left, Forward, Backwards, Stop
Up, Down, Right, Left

TRVs are ideal for games: for example, each player starts with one point. Using a pack of cards the user has to state whether the next card is >higher= or >lower= or >red= or >black= for a doubling of their point's total - OR - >hearts=, >spades=, >clubs=, or >diamonds= to treble their points total. The user may stop at any time by saying >stop=. The person with the highest points at the end is the winner.

TRVs give control to the augmented communicator with minimum effort and without the need for many hours of vocabulary instruction. *Temporarily Restricted Vocabularies*:

X   allow switch users to participate in lessons on an equal footing with peers;
X   may be easily spoken in real time; the class is not made to wait for long periods while a

user generates a response;

X   can ease the pressure felt when asked a question;

X   ensure users are not singled out as special - everyone is the same;

X   are easy to set up; vocabulary may be quickly programmed into most communication systems by the staff involved;

X   involve subject tutors and their staff in the tuition of new vocabulary;

X   do not require many hours of vocabulary tuition before their use;

X   may be themed, paged, setted, or categorized for the ease of a scanning user;

X   speed access to vocabulary for switch users;

X   allow symbols to be displayed at a larger size to ease selection. Later these can be added to a Learner's symbol board at the standard size;

X   may be used to teach and test key concepts;

X   are best used with all pupils or students in a class or group;

X   are always $\exists$ 2 but typically # 6.

Waiting equates with Segregating

> IEP Target: 'The Learner will wait for his turn patiently'

The above is not an unusual IEP target. It's a pragmatic skill that all people have to learn at some point in their lives. We have to learn to wait in line in shops, in queues at various entertainment facilities, at the bank … the list goes on and on. However, Learners experiencing Special Educational Needs spend a great deal more time waiting than others. We are always concerned (as we are observing any session in any educational establishment) when it appears that a particular Learner (or group of Learners) spends more time waiting than being actively involved. In some of the more extreme cases, the Learner's differential treatment has meant that s/he was effectively segregated while being in the same class!

> - When asking questions of a group in class the teacher addresses a particular question to the first member of the group and waits for a response before moving to the second member. By the time the teacher has reached the last member of the group many minutes have passed. All learners have spent more time sitting and waiting than responding.

> - When working with an Object of Reference, staff pass it around the group from the first to the last member. Each waits his/her turn with the OOR and waits while others have their turn.

> - When working with visual aids to the current learning, the teacher works with one individual at a time. All others await their turn.

> - The teacher asks the Learner a question and waits while a response is generated. The Learner has to scan her system using a single switch automated scan. The vocabulary she needs is not all on the same page and it takes some effort and some time to build a response to the teacher's question. Meanwhile the rest of the class are waiting …

- Each member of the group has to say 'Good Morning' in Circle Time. Staff start with Sam and then move on to Julia and then to Jonathon …

- The teacher asks a question and pupils put up their hands and the teacher picks out a particular learner. Often, when that person is the Learner, and the time taken for any response is so slow, the teacher (consciously or unconsciously) may begin to avoid selecting the Learner in any future Q & A session.

In both Special Ed and General Ed classrooms, Learners spend a great deal of time waiting!

In such ways, and others, the Learner:

- begins and reinforces the process of becoming passive;
- starts to become anxious about questions and question times;
- is singled out as different by staff;
- is recognised as different by peers, who begin to build negative opinions about the Learner and the Learner's ability.
- recognises that s/he is different from others leading to lower self esteem.

None of the above are examples of good practice. Ideally, we would want to restrict the amount of time that any member of the class spends waiting. How? The following are just some of the possible techniques that can be employed …

Individual … class … individual … class … individual …

In this approach, all questions and tasks addressed to an individual are interspersed with questions and or tasks addressed to the whole group. Thus, no member of the group is sat waiting his turn for a long period without any activity or involvement whatsoever. For example, Sam says "Good morning" to the class and the class all respond by signing and saying "Good morning" back to Sam.

Questions first, Answers later

In this approach, any or all of the following methods may be used by staff. Staff:

- ask each member of the group a question (or, as in the example given earlier, paired members). However, no one is expected to answer right away, they all have time to think and formulate their response.
- actually state the questions that will be asked at the end of the lesson, at the start of the lesson so that each pupil has to listen out for the answer to their particular question in the course of the session.
- ask each member of the group a question, then move back to the first member of the group and ask if they are ready to respond. If not, staff accepts and returns to them later. No one is pressurised, little time is wasted while waiting and the Learner has time to construct a response.
- Peer Partnering

- use a TRV methodology …

Temporarily Restricted Vocabulary

As we have seen. TRVs are a good way of reducing waiting time.

Preparation

Having the resources ready for Learners is a must. If answers are to be given using symbol cards, then they must be ready. Staff should not be scrambling around trying to find the necessary vocabulary card or cards so that Sam can join in and give an answer.

<u>Class, Group, and Individual Work</u>

It is good practice to vary the teaching methodology/style and learner experiences within any one session. As part of that approach, the Learner should experience working as a part of the whole class, within various subsets of the class, working with a 'paired peer' and also working alone. There should never be a time when the Learner is sent off to work with Miss X at the computer while the rest of the class get on with some other task. There may be times when some of the class are working individually and some are working in groups; that is fine, as long as it applies to the whole class and not just to our Learner. Round Robin approaches, where the individuals working alone come together to form sub-groups and the sub-groups split to begin individual work are also good practice providing that the Learner is fully included.

If the Learner is working at the computer, there should also be other learners working at other computers …

"That's fine if you have more than one computer. In our class we only have access to the one computer system."

… in that scenario, Sam should not be the only member of the group working alone (with Miss X) at the computer during any session. Others take their turn replacing Sam during the session.

"but Kay can't produce any work without access to the computer so she needs to be using it for a disproportionate amount of time when compare to the other students"

… then that marks out Kay as different. The other students may begin to resent their lack of access to the computer. Find other (creative) ways for Kay to produce class work without monopolising the computer.

<u>LISA the LSA</u>

Learning Support Assistants are common in many schools. However, necessary and practical they may be, if they are used badly they may serve to mark out the Learner as different and build resentment, not just from peers but from Significant others too.

LSAs should (this list is not intended to be totally comprehensive)(in no particular order of merit):

- spend some of their time helping others within the class as needed;
- learn when to provide Learner assistance and when to step back and permit Learner independence;
- help in the preparation and planning of sessions with the tutor and other staff;
- organise and maintain Learner support materials;
- aid the teacher in evaluating, marking, and assessment of learners as requested;
- maintain records of individual progress and learning as requested;
- provide personal care to specified Learners as appropriate;
- ensure that personal care does not disrupt learning by scheduling it at appropriate times of the day (if possible);
- support the technological needs of specific Learners.
- promote specific skills in Learners;
- promote the general progress and well being of (particular) learners within the group;
- provide guidance and advice to students on educational and social matters;
- make (or contribute to) records and reports on the personal and social needs of learners;
- communicate and consult (with teacher awareness) with Significant Others including the parents/ carers of pupils;
- communicate and cooperate with professionals or bodies external to the school reporting to the teacher;
- accompany and supervise learners on trips from school;
- provide and or contribute to oral and written assessments, reports and references relating to individual learner and groups of learners;
- take part in in-service training days outside of the Learner's term dates;
- help maintain and monitor order and discipline;
- safeguard learner health and safety both when they are on the school premises and when they are engaged in authorised activities elsewhere;
- participate in meetings which relate to the curriculum for the school or the administration or organization of the school including pastoral arrangements;
- attend Learner case conferences and review and related meetings;
- aid in the preparation for public examinations and the smooth running of such examinations when they are in progress;
- attend assemblies, registering and supervising pupils, whether these duties are to be performed before, during or after school session;
- support all the school's designated protocols, policies and practices;
- any other duty as requested by the school management.

While LSAs can expect to be involved in any aspect of the educational establishment's life, their primary role will be in providing the necessary support to individual Learners. Learning when to hold back, move away and permit Learner independence is a skill that they must acquire to be effective in that role. They must learn to work in support of not on behalf of the Learner. As this paper is particularly concerned with switch development, LSAs should be informed on working with such technologies and work with the teacher to promote considered good practice.

Appendices

One - Ten Switch Rules

When working with switches, there are 10 primary rules that, generally, should be observed:

The first of these concerns maintaining switch position: not just during an individual's use in any session but across the curriculum for all uses of a switch for the Learner. A switch on the Learner's left in one session, right in another, mounted in different positions, at different heights makes the likelihood of mastery more remote. Take a photograph of the ideal position and keep it with the Learner so that everyone can see it and ensure that this position is maintained.

The second rule concerns labelling switches. The use of labels to indicate a switch's function is important when the Learner is in a position to see the switch (visually impaired Learners can access tactile switch caps). We have seen Learners working with BIGmacks across several classroom and each time without a label. How is the Learner ever to make sense of this? When activated in one environment it says one thing and causes another to happen. When operated in yet another environment something different occurs. Label switches!

The third rule explains that language focusing on the use of the switch and not on the POLE (Person, Object, Location or Event that the switch controls) is not considered good practice. Thus, it is better to encourage the Learner to 'turn on the music' rather than to 'hit the switch'. Our advice is to avoid using the word 'switch' or, at least, only use it in the form 'switch on the music'. Ideally, the POLE word is spoken last (Turn on the FAN).

The fourth rule states that whenever possible switches should be mounted and not held. Holding the switch could lead to unintentional Learner assistance. Sometimes this is a desirable feature: for example, when helping an individual to understand that a switch controls an aspect of the environment. However, especially when assessing ability, it is important that switches are mounted rather than held.

The fifth rule states that switch and POLE should be proximal in space and in time. When activating a switch the Learner needs to associate it with its POLE and therefore if the POLE is distal there is less chance of that association being made. If a switch is connected to an electric kettle for example (not recommended for safety reasons) – the kettle does not begin to boil for some time – the Learner would not make the connection between the original activation and the boiling kettle.
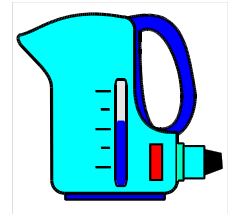
The sixth rule recommends that switches are removed when not being used or when disconnected. There is little point in trying to establish cause and effect if a switch is left for a Learner to access when the switch does not perform some action. If a switch is disconnected then it should be removed.

The seventh rule concerns maintenance of the switch style for at least the use of the same POLE across the curriculum. Thus if a round, large, red switch is used for music in one session then, ideally, a large, round, red switch should be used for music in all sessions (don't forget the label!)

The eighth rule concerns the safety of the Learner. Switches should not be directly connected to dangerous objects that would expose the Learner to harm (boiling water, fast moving machinery, heated surfaces, heavy objects that could be pulled onto the Learner by pulling on the switch cable). While it is appreciated that Learners should experience boiling a kettle to make a drink for example, there are measures that should always be observed to ensure Learner safety: remote switches can be used, the Learner should not be left unattended, and the Learner should be a safe distance from the boiling kettle … (risk analysis methodologies should be used to minimise the risk)
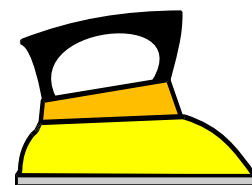
The ninth rule is that it is important that facilitators provide a <u>sufficient response time</u>. Facilitators should not interrupt by filling in any lapse in time with additional language (comments and commands) which will (tend to) confuse the Learner. If you have to do anything to assist (after a while) you might try:
- pointing to the switch;
- repeating the original command ('John, switch on the light');
- adjusting the switch position (if it appears this is causing a problem);
- eventually (and only if it appears that nothing is going to happen), demonstrating the action by hand on hand (if a hand is being used) and assisting the Learner to activate the switch.

There is obviously a limit on how long a facilitator can afford to sit a wait before prompting the Learner. Just how long that limit should be is not easy to specify for it will vary from Learner to Learner and according to the task. There may also be a need to modify the task as it may be either too difficult or not motivating for the Learner.

The tenth rule is 'maintain the goals'. It is likely that other therapists (Occupational and Physio) will make requests that switches are adjusted to suit some alternative therapy goal – for example, to aid muscle control. This should be resisted! Do NOT take on board another's goals when working with switches – your role is to promote access (ease of access) so that the Learner that the greatest chance to understand that the switch is causing the effect and the greatest chance of success. If the switch is raised slightly or repositioned to suit another's goals then it can reduce the likelihood that you will achieve your stated goals. Resist such demands! Just say NO. That is not to say that these therapy 'goals' are not important, they are. However, they should be addressed at other times and through other means than the use of switches.

Two - Additional Switch Notes:

- Switches need not be hand operated: other parts of the body can be more effective for some people.

- Switches need not be flat mounted: they can be positioned at any angle. In some cases, it is better to mount the switch upside-down just above the Learner's hand. Learners, in raising their hands only a fraction, activate the switch and, instead of having to attempt to remove their hand from the switch, gravity takes their hand away, down to its resting place ready for the next activation. Mounting switches easily and swiftly can be achieved with the Sensitrac range of products.

- Switch labels can be protected with switch caps. Some switches come complete with switch caps (the Access Switch for example), some require that switch caps are purchased separately.

- Switches can be 'coated' on the base with Ultra-Mate Velcro. The hooks side should be used. The hooks will then attach to any loop (soft side) Velcro (as on the Sensitrac range of slider plates) or to most carpet tiles or pieces of carpet (Carpet could be cut to match the shape of a Learner's wheelchair tray so that a switch or switches can be positioned anywhere with ease). Ultra Mate Velcro circles – sized for most switches can be purchased from Liberator. Ultra Mate Velcro rectangles may also be purchased from Liberator. Ultra Mate Velcro is extremely strong – probably the strongest on the market for the size of hooks and loops.

Switches can also be mounted with UltraStick. This is a thin film of jelly like material that is very tough and sticky. This is positioned between the switch and the surface and holds firm even to vertical surfaces! The switch can be removed and the UltraStick can be reused. If the ultra-Stick gets dirty it loses its adhesiveness. However, a quick wash with soap and warm water and it is like new once again. Magical stuff! UltraStick can be purchase in various shapes and sizes from Liberator. RJ Cooper markets an excellent alternate product called 'stick and suck' (also available from Liberator). Stick and suck is a thin (about the thickness of double side picture mounting tape) disk. On one side is a permanent self-adhesive. The other side consists of thousands of very small suction cups so small that you are unable to see them. They are sold as sheets. Each sheet consists of two 2 1/4" disks and one 3 1/4" disk. The smaller ones can be used for Medium Access switches, Buddy Buttons, Jelly Bean and similar switches, and the larger ones for the Big Reds, Big Buddy Buttons, Big Macs etc. Once in a while, it will be necessary to clean the suction pads by sticking and then peeling wide cellophane packing tape to/from its surface.

- Switches can be adapted with Tactile Switch Tops – TSTs can be easily made from switch caps (do not adapt the surface of the switch itself – this is costly) using Spray mount glue and a template (easily made out of a piece of paper or card with a circular hole cut to the just less than the size of the switch cap). The glue is sprayed through the template onto the surface of the switch cap. This leaves a neat circle of

glue on the switch cap onto which glitter, sand, polystyrene and other substances could be added. The sandy surface cap could then be used for all instances of working with music (the sand of music!) and the other surfaces aligned with other switching activities (the connection can be purely arbitrary so long as it is consistent).

- Tactile Switch Tops (TSTs) can also be created (on switch caps) using the hot glue method. This involves placing the symbol or other drawing below the cap and tracing its outline with hot glue onto the surface of the cap leaving a raised line that can be felt by the Learner when accessing the switch. For example, music could be represented by a musical note.

- TSTs can make an ideal accompaniment to OOR for some Learners. Where possible, they should be kept in the OOR bag and be labelled on the underside (not seen during use) with the Learner's name and POLE (for example, Jake - Music). Again, it is hoped that the Learner will come to associate a particular TCT surface with a particular POLE and learn to anticipate a forthcoming event. The sensory surfaces could then be used to make choices or communicate basic needs and wishes on a communication board.

- Wobble Switches are ideal switches to try when other switches don't meet the need. These are spring mounted with a small ball at the end (see picture). Hitting anywhere on the surface of the spring ball arm causes it to bend and, in turn, activates the switch. Thus, the arm can follow through on the move, the spring bending out of the way. They will work in any direction and are as easily mounted as the other switch types that have been illustrated. Furthermore, the spring can be extended using ordinary pipe insulation that can be purchased from any DIY store. This slides over the ball on top of the spring as if it were made for the job! Thus, the spring is extended and the lagging can be cut to the ideal length. Wobble switches can easily be operated with the head, hand, foot or, indeed, any suitable part of the body.

- Gewa's Big Jack is a simple infra-red environmental controller allowing from one to six switches to control any item or aspect of an item within the environment

- There are a plethora of specialist designed switches on the market. Liberator retails a whole range, too many to illustrate here (check web site for details www.liberator.co.uk or e-mail for a catalogue Sales@liberator.co.uk).

Three - Developing Cause & Effect Understanding in Severely Multiply Impaired Learners

The Learner will be asked to activate a single access switch to create various sounds and images on the computer screen. Teaching techniques will include cueing, hand over hand manipulation, fading, direct, delayed, and intermittent reinforcement as provided within the software.

Goals Targets and Objectives:
The main goal of this plan is to develop, encourage, and maintain active interaction with, and control over, the environment by activating single access switches to produce the desired effect.

The specific target skill to be acquired is demonstration of cause and effect while activating a single switch. Other skills that may be acquired but are not targeted are:

- tolerance of objects on Learner's tray/desk, tracking of sound,
- tracking of image on a screen,
- signaling awareness of change in environment,
- attending to computer screen,
- demonstrating alerting response to sound,
- responding to screen change,
- increasing functional use of limbs/body to activate the switch (switch may be activated by various body parts including but not limited to the hand, elbow, head, dependent on individual Learner physical disability).

This lesson may also serve as a precursor to, or in combination with, switch activation lessons in which Learners are taught to use single access switches to control various environmental elements, and augmentative communication devices.

Materials/Hardware/Software:
To complete this lesson Learners should have consistent, frequent access to the following:

- A computer with single switch access hardware and sound card.
- Ability to record messages is a plus but not a necessity.
- A 17 inch or larger monitor screen size is preferred but smaller sizes may work. For this population the larger the screen size the better as the purpose of the lesson is for the Learner to focus on the computer screen.
- Updated sound cards with realistic speech sounds (as opposed to the robotic speech of the older cards and computers) are preferable but not necessarily a requirement.
- A single switch that the Learner has the ability to activate. This may be a puff switch, movement activated switch, motion detection switch, or a direct touch activated switch.
- Trays or mounted holders that allow the Learner to activate a single switch.
- For this lesson plan, 101 Animations, published by RJ Cooper & Associates will be used. However, nearly any software that is activated by single switch may be used. It is important that the Learner finds the images and sound produced by the hardware stimulating. The teacher may want to experiment (as budget and time allows) with different programs to find the one that works best for their Learner.

Technology Rationale:
Learners with severe multiple impairment have little or no control over their environment. Activities of daily life are done either to them or for them. Technology provides for at least the possibility that these Learners may achieve a modicum of control over their lives.

Activities/Procedures:

Teacher pre-activities:
1. The teacher will need frequent access to a computer which has single switch hardware, sound card, and software that is activated by a single switch. In this case, 101 Animations, published by RJ Cooper.
2. The teacher will need to experiment with the kind of switch (puff, motion sensor, motion detection, etc.) and the placement of that switch to determine the combination that is easiest for their specific Learner to activate. Placement of the monitor and lighting conditions are also important considerations. A darkened room in which the only light source is the monitor itself may be the best environment for your particular Learner. Consultation with Physical and Occupational Therapists when making this determination can prove to be beneficial.
3. The learning environment should be as isolated as possible from other activities and Learners to help eliminate, as much as is feasible, any potential distractions.
4. The teacher, optimally, should work with the Learner using a one-on-one ratio for at least 15 minutes per day. Other Learners may watch the activity but care should be taken that these observers are not serving as a distraction to the Learner being focused on.

Activities:
1. Load the program on the computer and guide the Learner to the desired activation sequence. The teacher may physically guide the Learner to the activation through physical cueing or hand over hand manipulation. Note: Verbal cueing is not used in this plan. The focus Learner is severely impaired. Language cues require that the Learner first process the verbal input and then act upon it. Consequently, verbal cues may act as a distraction for the Learner rather than provide necessary and or helpful information.
2. Once the switch has been activated monitor Learner for response to the sound/screen. The teacher may react to the screen with single words or short phrases but it is recommended that the teacher keep language to a minimum. As much as possible, allow the sound and screen to be the reinforcer, thereby allowing the Learner to focus on the screen rather than on the teacher's language or on the teacher.
3. Fade cueing a Learner becomes more proficient. Give as little cueing as possible throughout the exercise. Adjust switch placement as necessary.

Assessment/Evaluation:

Criteria:
As with any Learner in this functional range, assessment must be individualized. The teacher must determine what criteria will best reflect attainment of specific goals. Criteria used for this plan may include the following:
- Eye contact with switch;
- Physical attempts to activate switch;

- Physical response to sound/screen changes (e.g. startle response, turning toward screen/sound, smiling frowning, etc.);
- Eye contact with screen;
- Number of independent activations within a predetermined time period.

Data Collection:
Progress within this population is almost universally slow. Therefore, data collected on a daily, or even weekly basis is often both time consuming and wasteful. It eats up teacher time that could be spent with the Learner and provides little if anything by way of meaningful information.

Baseline data is collected on areas of criteria identified for the first one or two sessions. Data can then be collected at rates of eight to nine week intervals. This will provide sufficient feedback to the teacher to evaluate criteria and monitor the setup of necessary environmental conditions.
An alternative to this method may be noting specific data of importance when it occurs. It is recommended that teachers using this technique list only achieved aspects of criteria rather than the multitude of negatives that the Learner is likely to receive.

Note: Due to the characteristics of this functional level, it is advised that work should continue at a consistent pace for several months. Teachers should monitor for very small signs that progress is being made. Document progress observed, even if it does not meet the pre-set criteria the teacher started with.

Follow-up Activities:

- Hook up a single access switch to an environmental control unit to turn on and off various electric appliances (lights, fans, mixers, blenders, radios, tape players, etc.)
- Hook up a single access switch to activate various battery-activated items (e.g. toys that make noise or light up, tape/CD players, radios, etc.)

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