

TechnoTalk

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building futures



Editorial

by Colin Slattery

Hi and welcome to the first Edition of TechnoTalk for 2006. I'm sitting in as guest editor this month for Jo Ford who is on long service leave until the end of February.

In this edition, we welcome one new staff member to TASC. Anna Titmuss joins us for a six month secondment into the technology arena from another department within The Spastic Centre. She joins us for three days a week. You can read more about Gail and Anna in this edition.

Also in this edition, Catherine reports on a workshop she attended at the International Seating Symposium in early 2005. Catherine presents an overview of "interfacing" multiple pieces of technology and the pros and cons of doing this.

We hope you enjoy this edition of TechnoTalk and, as always, we appreciate any feedback you may have.

Regards

Colin



Interfacing Assistive Technology with Power Wheelchairs

by Catherine Kos

This article will provide a basic summary of information provided in a workshop I participated in at the International Seating Symposium in January 2005.

The workshop was presented by Michelle L. Lange (OTR, ABDA, ATP, Assistive Technology Partners, The Children's Hospital of Denver). It presented practical information about interfacing technology with power wheelchairs; including assessment considerations, different types of power chair electronics, general set-up principles and considerations for interfacing power chair actuators and speech generating devices, computers and/or environmental control units.

The workshop also provided the opportunity for participants to 'program' different power chairs, with various electronics and access sites, however this article will focus on the considerations for therapists beginning to identify suitable clients for interfacing technology with powered mobility.

Further assistance can be gained from wheelchair suppliers and/or TASC Consultants regarding individual programming capabilities.

What is 'interfacing'?

Michelle Lange described 'interfacing' as "sharing an access method to control more than one assistive technology device" for example, using a head array system with three

switches activated by a person's head movements to operate a powered chair, speech generating device and computer (all via the same switches/switch sites).

Various combinations of devices and/or applications can be incorporated within an interfaced system, for example:

- power wheelchair
- power wheelchair actuators (eg. tilt, recline, elevating leg-rests)
- speech-generating devices
- computers
- environmental control units
- any switch output

We often also use the term 'integration' to define this, however the workshop presenter took the view that 'integration' is in fact a different construct meaning that it "ensures that assistive technology devices work together, but does not share an access method".



Dynamics Hand-held Programmer.

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Advantages of 'interfacing'

Successful interfacing can result in many technologies being capable of working together. This can be particularly beneficial, as it streamlines access for people with limited switch sites or control. Depending upon the client's requirements, this option can also be less expensive and more readily be adapted and added to, if the client's abilities are expected to improve over time.

Disadvantages of 'interfacing'

The primary disadvantage of an interfaced system may be that the user finds it difficult to operate, due to the complexity of use of such a system. The cognitive requirements may differ, depending upon the electronics used, however it is important that this is considered and explored at the outset of the assessment process. Other potential disadvantages include; the interdependency of the system (ie. if one part of the system experiences problems, the whole system may be affected); difficulties with various technologies/companies working together.

It is important to remember that people may need to use the one switch in various ways for different purposes (for example sustained contact for driving, but quick, momentary activation for scanning to operate a device).



MK4 Programmer.

Assessment considerations

Somebody may be a potential candidate for exploration of use of an interfaced system, if they exhibit the following:

Physical factors:

- Appropriate motor control to use separate access methods for various assistive technology devices (consider active range of motion, muscle strength and endurance required to reach and control several different access methods)
- Difficulty reaching the selected access method during periods of weight shift (eg. when tilting the chair)
- A strong, reliable switch site, which could potentially be shared to improve their access to more than one device.
- Ability to access the same switch in various ways, requiring different motor control, as required by the device (eg. sustained activation for mobility versus rapid click for scanning for device operation)

Remember, if interfacing results in compromised access to an assistive technology device, it should not be pursued (eg. if someone uses a joystick to control their power chair and a keyguard to assist with direct access to their speech generating device, it would be inappropriate to interface the speech-generating device with the wheelchair control [joystick]).

Cognitive factors

- Understanding of a multi-step system (ie. do they understand that under certain circumstances the same switch will operate the device differently or it may operate a completely different device altogether)
- Adequate memory skills to remember what is being interfaced and what they need to do to control the system
- Appropriate sequencing skills to employ the activation sequence required to operate the various functions
- Literacy and understanding of the English language (if required)

Sensory factors

- Adequate vision to see the display clearly

Interfacing set-up

The set-up required for interfacing will vary according to different types of electronics and the user's needs and capabilities. A general guide to what you may need to incorporate though includes the following:

- a power wheelchair
- driving control (eg. joystick, head array, switches, sip-n-puff, etc.)
- reset or mode switch
- on/off switch
- additional switch for reverse (sometimes)
- a module to connect any devices to be interfaced (ECU, speech-generating device, computer, etc)
- cables to connect the devices to the module/s



Penny and Giles Programmer.

Changing modes

To be able to interface a power chair with assistive technology, you need to be able to change modes or drive profiles. This effectively tells the controller to stop operating what it was using and begin to operate whatever else is programmed in the new mode/profile selected (eg. stop driving slowly and begin to operate a speech generating device).

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The terminology used to describe this process may vary between different systems and electronics, however the principle is usually the same. To be able to change modes you generally need a reset (or mode) switch, to stop the operation of whatever is happening. You then may use the control device to scroll through various drive options. A reset switch requires less motor control than the site occupied by the drive/directional switches. It is also used less often and is less time dependant than the driver control.



An example of interface cables configured for activation of a left and right switch. (Taken from Workshop handout page 32).

An additional switch, of course requires the need for another access point. This is highly preferable, as if there is no other access method available, the user may need to rely on a 'standby function' to change modes (ie. after a certain period of time with no input from the user, the chair ceases to operate whatever function it was engaged in).

This can have implications for people attempting to use devices, particularly if scanning is involved or as a prolonged pause for thought processing, etc, may result in the device being turned off without warning. Standby functions also appear to require higher levels of cognitive functioning to adapt to and master.

Reverse

A reset/mode switch can be programmed to toggle between forward and reverse directions. This can benefit people who find it difficult to maintain contact on a switch for an extended period of time to reverse. The disadvantage with this configuration may be that the user has to rely on the standby function to access other drive profiles/modes. When identifying options for reverse it may be recommended to start simply (eg. omit the reverse option) and ensure that the system allows for the capacity of 'adding' another switch/options to include reverse in the future.

Interfacing power actuators (eg. power-tilt, recline, elevating leg-rests)

May be beneficial, as maintaining control of hand accessed joysticks can be difficult during weight shifts. The ability to interface power actuators is usually inbuilt in chairs now, negating the need to attach external cables to a module. Power actuators can be programmed to operate as latched or momentary. Latched actuator control may be useful for people who prefer to move from one end of the range (eg. tilt) to the other. Again, this can be helpful for people who experience difficulties maintaining control

during weight shifts.

Interfacing speech generating devices, computers and environmental control units

Advantages

Benefits of interfacing devices with a power chair may include: streamlined access; ability to share a strong access method; the existing access method for the device does not have to be moved to the chair; increased independence as the person may not have to rely on others to connect and disconnect cables; wireless options are available to transmit to desktop computers.

Disadvantages

Possible concerns inherent with interfacing devices may include: compromised access efficiency – especially if a shared switch is required for scanning; cables are required – these may need to be disconnected by others, depending upon the chosen set-up – this can increase dependency on others; increased cognitive demands.

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New Staff

Anna Titmuss

Hi, my name is Anna Titmuss, although with my up-coming marriage in February, my name will change to Anna Bech (pronounced Beck)!!

Since April 2003 I have been working as a speech pathologist for The Spastic Centre and have gained a range of experiences working on different teams.

First I started with the ROADSS team, working with families and therapists from Rural NSW. Since January 2004 I have been working with the Metropolitan North and East Children's Services team. I have been involved with TASC therapists over the years and found them a valuable resource – they have introduced me to the world of voice output technology!

For the next six months I will be working with TASC for three days a week and will continue working with Children's Services for the other two days.

I am excited about this opportunity to work on the TASC team and to learn new things!

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Considerations

Make sure a back-up method of access is provided, in case problems are experienced with one part of the system. Think about if it is safer or more functional to program the ability to access devices into a mode/profile that is 'non-drive' or without tilt or recline. Do not program a standby function into a mode/profile when someone is using scanning to access a device, as it may result in the system reverting out of the drive mode, before the person has finished using the device (eg. mid-sentence, before they have finished communicating what they want to say to someone). Many speech generating devices can be interfaced with a computer or ECU and used as an access method, this will negate the need for additional cables and programming.

Equipment needed

1. *Module* – eg. 'Communication Module' (Invacare): a single module can have two devices connected to it (labelled on the module as ECU1 and ECU2 – meaning any device). If more than two devices are going to be incorporated within the system, another communication module can be added (providing connections for ECU3 and ECU4). The Penny and Giles module is known as an auxiliary

module. This works in a similar way – providing two 'channels' for device connection per module.

2. *Interface cables* – can be common to different types of electronics. The cables need to be ordered with the correct configuration required, to program the directional movement that will be used to activate the device (eg. left, right, forward). Suppliers should be able to help you determine what is required, if you are able to communicate your client's abilities (eg. if you can tell them that the user requires a cable to connect the wheelchair to a device which they will activate with the backwards movement of their head on a head array switch, the supplier should be able to recommend what cable configuration is required).

Programming

Each system with its own electronics offers a wide range of programming capabilities that need to be fully explored and investigated with clients, their support team, suppliers, technicians and therapists. Sufficient attention needs to be paid to ensuring that new experiences with interfacing powered mobility and assistive technology are successful and safe, therefore it is essential that everyone who needs to be involved takes an active role within the team. Extensive

periods of trials with all equipment and access options are thoroughly recommended by TASC. It is important that users are supported to develop their skills over a period of time. For this reason, it may be imperative to consider technology options that provide a realistic starting point for the person to gain confidence, with options to incorporate other forms of technology in the future.

Please contact TASC Seating or Technology Consultants and/or wheelchair and technology suppliers for specific additional information.

References:

'Interfacing Assistive Technology with Power Wheelchairs'. (Michelle L. Lange, OTR, ABDA, ATP). Workshop presented at International Seating Symposium, January 2005, Orlando, Florida, USA.

We welcome any feedback, good or bad, that you have on our service. Please feel free to contact us by phone on 02 9972 8183, email at tasc@tscnsw.org.au or in writing at the address below.

TechnoTalk is available free from www.thespasticcentre.com.au/news/index.htm or by subscription for \$27.50 (GST \$2.50 incl)



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For people with **cerebral palsy** and their families.

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