Physical Disabilities & ICT

BECTa

British Educational Communications and Technology agency

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About this information sheet

This sheet aims to provide you with:

- an introduction to the growing emphasis on the place of information and communications technology (ICT) for pupils with special needs
- a list of organisations, both voluntary and commercial, which provide information, advice, training, hardware or software relevant to students who have physical disabilities
- details of some published sources of information and advice on ICT and special needs.

This sheet can be accessed on the Internet:
- in summary at: *http://www.becta.org.uk/technology/infosheets/html/physical.html*
- in full as a pdf file at: *http://www.becta.org.uk/technology/infosheets/pdf/physical.pdf*

Introduction

When people think of physically disabled pupils, they tend to think of children in wheelchairs and those who have problems with mobility. Often, they think of children whose legs don't work, and they start to worry about ramps and toilets and access to the building rather than access to the curriculum and learning. In fact, there are many children who have problems with manipulation, either because of painful joints, poor co-ordination or degenerative conditions. There is also no shortage of children with broken arms and, whilst this is a temporary condition, nevertheless the child cannot be allowed to get behind if, for instance, GCSE course work is pending.

Some learners with physical disabilities may find it difficult to record their work in class using conventional methods. For these students, ICT is a way of enabling them to access the curriculum alongside their peers.

What types of ICT can help and specifically how?

Well-chosen ICT can make all the difference. For pupils who struggle to form letters, who tire easily or who have limited motor control, computers may be their only way of getting their thoughts onto paper. For instance, teachers who participated in Becta's laptop project found that word processing worked well for children with motor co-ordination difficulties because they found it easier to hit keys than to form letters. One reported, "I have a child with poor fine motor control and using the keyboard is helping him gain confidence". Another said, "A pupil in my class with arthritis finds it a real bonus".

However, there is now such an array of software and alternatives to the keyboard and mouse that you need to know what you are doing or you could end up spending a lot of money to little real effect.

Types of peripherals and software which may particularly help students with physical disabilities are:

- head pointers or head mice (especially optical)
- keyboard/mouse accessibility utilities and keyguards
- overlay keyboards
- predictive word processors
- switches and scanning systems
- touchpads
- trackerballs and Joysticks
- voice recognition.

Ultimately, the student must feel comfortable with the technology.

Hardware

In some cases a desktop machine might be better because it has relatively big keys, a separate mouse, and is quite robust. On the other hand, if a pupil is in a wheelchair or needs access in lots of different places, a laptop might be better. The *Panasonic Toughbook* from Centerprise is quite a popular choice because it can be attached to a wheelchair and is designed to withstand lots of bumps or knocks.

However, if a pupil is walking and has to carry books and kit around a school, weight may be an issue. In that case, you might want to go for something like an *AlphaSmart*. It is cheap, has a normal-sized keyboard with word processing software and a built-in scrollable display. Text is easily uploaded on to a Macintosh computer or PC for formatting and printing. The new infra red version makes printing very easy. The basic models are lightweight machines which can be used for text entry. They also have a thesaurus, spell-checker, calculator, calendar and personal information manager. As you move up the range and cost bracket, you get more options, including a built-in disk drive and facilities for connecting to a network or the Internet. However, the small screen size can be an issue with this sort of device.

Once you have a machine, consider how users are going to navigate around the screen. These days, most software is controlled by using a mouse to direct a pointer on the screen mouse and a keyboard for inputting characters on the screen. However, both of these can be a barrier for some people.

There are a number of variations on the traditional keyboard. Some, with chunky keys, are sturdy enough to withstand a real hammering and offer ABC or Qwerty layouts (e.g., Big Keys). Alternatively, there are small keyboards with built-in trackerballs and wrist rests which can be ideal for users with limited hand movement (for example, muscular dystrophy). Keyguards are available for a range of keyboards and can help students with a tremor to locate the correct key.

The concept or membrane keyboard used to be very popular, but in recent years it has been discarded in favour of on-screen grids such as 'Clicker'. This is a pity, because it is an incredibly versatile tool and teachers are beginning to find it invaluable for navigating around the hot spots of a CD-ROM. Overlay keyboards, in particular *IntelliKeys,* can be used for a wide range of activities including controlling the screen pointer.

Touchpads, joysticks and tracker balls can be helpful for those who do not have the dexterity to operate a conventional mouse to transmit instructions to a computer. Provided that they can be connected in the same way as a standard mouse, they should work without any additional adjustment other than the alteration of the mouse speed settings in the control panel. For those who find that they are able to move the mouse but cannot manage to control the buttons, there are mouse interfaces (for example, the SEMERC Mouser) available which will allow the mouse buttons to be switched off and replaced by external switches if required. In terms of physical disability, the joystick has the advantage that it may already be a familiar item, for instance, on a wheelchair. The touchpad has the advantage that it requires only the lightest touch to operate, which means that it can be good for people with restricted movement and stamina.

In the past, up alternative devices to the computer was a problem. For example, if pupils had different needs but were using the same machine, it used to be necessary to switch off, load a new device, then switch on again and then maybe find it hadn't worked! This wasted a lot of valuable lesson time. Now, most new machines have a universal serial bus (USB) port on the back and many devices are USB-friendly. A USB port offers the advantage that you can have up to 128 interchangeable devices to plug into one computer and the connections are quite sturdy with no pins to bend. Best of all, the software automatically recognises the devices when you plug them in, so you don't have to restart the computer. Although not all alternative devices are, as yet, USB compatible, make sure the computer you buy is!

Software and settings

There are many options and alternatives which come as part of the standard Windows environment which can improve access for physically disabled learners. These include slowing the mouse speed down or using a 'sticky keys' option, which means that you don't need to hold down two keys at once to carry out an action but can hit them one after the other. Slowing down the keyboard 'character repeat' speed can help users who have a tremor, so that they do not end up with strings of unwanted letters. Alternatively, the filter key setting in the 'Accessibility' options on Windows stops the letters repeating themselves. Keyboard shortcuts can make it easy to carry out many of the

functions you need to use – for example, saving or copying a file, or deleting a section of highlighted text. Apart from the hundreds of standard shortcuts, users can create their own for actions or sequences they find hard to do. Thus it is possible to get around a PC without a mouse or similar device. Small adaptations to settings may be all that is needed for some learners, but others may need a little more support.

Some children find it hard work to put text together, and as they write so slowly they lose track of their ideas. Microsoft Word software provides an AutoText facility (in the Tools menu under AutoCorrect). Although designed to aid mistyping or misspelling, this handy little device means you can set up a list of abbreviations which the computer will recognise and expand into words or even sentences. For example, if you are studying *A Midsummer Night's Dream*, you can save over 20 keystrokes by setting up MSND to be turned into the full string automatically by the computer.

Also, consider using word lists. If there are standard terms such as science words or a core vocabulary for a topic such as the Egyptians, you can use *Clicker* or other on-screen grid software. Special switch software utilities can also allow single and double switches to access standard software, although this is often very tiring and frustrating for the switch user to achieve.

Predictive word software can be helpful in cutting down the number of keystrokes required to produce a document. Type in the first letter of the word that you want, and up come suggestions on the screen for you to choose from. If the word you require appears, you select it by pressing your mouse button or an adjacent number. If it doesn't appear, then type the next letter for a further list and so on. The more often you choose a word, the higher up the list it goes, so it quickly learns core vocabulary for a subject. However, for some users, predictive word processing software can be very *unhelpful* and actually slow down the process of text delivery.

Some software displays the keyboard on the screen so that words can be written by clicking with the mouse on individual letters. It can be useful for learners who find that the effort of pressing a key limits the amount they can write, or for switch users who are unable to use any kind of physical keyboard.

Voice recognition can be invaluable to many pupils with different disabilities or learning needs. Becta is currently running a project to assess the use of voice recognition software with such pupils. Details of the project are given on the Web at: *http://www.becta.org.uk/inclusion/speechrecog/index.cfm*, and a little background on speech input technology is given on the general 'Special Needs and ICT' information sheet. On the surface, this technology would seem to be ideal for people who can speak but do not necessarily have good motor control. However, many users with physical problems find that it can be a frustrating experience for them. Sometimes they have problems with the physical effort of speaking loudly enough for the machine to hear them, and often the pattern of their speech varies depending on the time of day and levels of fatigue. To improve performance rates, you may need to invest in a microphone volume booster: a small box costing about £12.00 which links the microphone and the machine and boosts the volume. It is essential for laptops and some desktops.

Additional considerations for learners with physical disabilities

For many students with physical disabilities, a multi-professional assessment is an essential starting point in the consideration of equipment. Parents and support staff should be involved wherever possible, and the views of the student are an important consideration. Many students with physical disabilities have needs that extend beyond the educational domain, and it is important that all those involved with the student (for example, occupational therapists, physiotherapists and speech therapists) are happy with the equipment chosen. The aim is to work from the learner's strengths, and only by consulting all the professionals involved with the student is it possible to recommend hardware, software and seating that will fully satisfy the learner's needs. Further advice about multi-professional assessment can be obtained from the ACE Centres in Oxford and Oldham.

All adults who work with the student, both at school and at home, must feel comfortable about the decision to adopt an ICT solution, as it is important for the student to experience a consistent approach. Where possible, a trial period for using new equipment should be considered. This is particularly important where unfamiliar kit or new procedures have been suggested. Support for staff and student during the trial period and the opportunity for evaluation and review should be built into the initial discussions.

It is essential to site equipment so that the student can use it comfortably. Wrist rests and arm supports can give additional support. The height of the keyboard and screen should be carefully

considered – a variable height trolley may provide more flexibility. The more powerful desktop computers have keyboards that can be positioned separately from the monitor. It is important that the student does not have to strain to see the screen and that his hands rest comfortably on the keyboard and mouse/trackerball/joystick without making him hunch his shoulders or raise his elbows. A copyholder or angled work surface can hold books and worksheets so that they are easily visible beside the monitor.

Publications

Becta publications

Access to words and images: using information technology to support the learning of students with physical disabilities
Becta/CENMAC, 1993 ISBN 1853792519
Covers a range of hardware and software and their application in supporting students with communication difficulties. Includes a list of resources and suppliers and flags developments.

Special Needs and ICT information sheet
Becta. June 2000, *Free*
http://www.becta.org.uk/technology/infosheets/html/senict.html
Details generic special needs and ICT information, in particular different types of software and hardware which can help, and lists of other sources of information such as organisations, publications and software.

Other publications

Computers and Inclusion – Factors for Success by Mick Donegan
ACE Centre / Becta publication, 2000
Shows how technology can support children with complex physical and communication difficulties and is illustrated with case studies of learners from 3 –15 in mainstream schools Available from the ACE Centre Advisory Trust.

Enabling Technology for Inclusion edited by Mike Blamires
Sage Publications Inc., April 1999
ISBN 1853964360
Looks at how technology can enable communication, socialisation and physical interaction with the curriculum. It is full of good examples and should help teachers think about how to integrate learners with a range of disabilities into mainstream classrooms.

Voice Technology in Education – Factors for Success by Mick Donegan
ACE Centre / Becta publication, 2000
Provides the reader with issues and strategies to consider before attempting to use speech recognition with learners who have physical and/or communication difficulties. It is illustrated with case studies of learners in mainstream primary and secondary schools. Available from the ACE Centre Advisory Trust.

Software

You should check on Becta's Educational Software database for fuller details on any titles cited below and to obtain a wider range of software products*: http://vtc.ngfl.gov.uk/resource/esr/*

Organisations

Please note that, for brevity and ease of maintaining these sheets, the details of these organisations, central to the whole field of Special Needs, are given only in brief on this sheet, with the full details held on the main special needs information sheet entitled 'Special Needs and ICT'.

> AbilityNet
> Advisory Centre for Education (ACE) Ltd
> ACE (Aiding Communication in Education) Centre Advisory Trust
> ACE (Aiding Communication in Education) Centre North
> CENMAC (Centre for Micro-Assisted Communication)
> The Chatback Trust
> Inclusive Technology Ltd (commercial)
> National Federation of ACCESS Centres
> Rickitt Educational Media (REM) (commercial)
> SEMERC (commercial)
> Special Educational Needs Joint Initiative for Training (SENJIT)

Internet sources

There are many Internet sources which may be of help, and the URLs are cited alongside the organisation, publication or other source to which the site pertains. This section is limited to sources believed to be available only via the, Internet or foreign sites where access will be greatly eased by making use of the Internet.

General

For brevity and ease of maintaining these sheets, the details of Internet sources central to the whole field of Special Needs are given on the 'Special Needs and ICT' sheet rather than repeating them on each specific sheet. Some of those general sources may also be able to provide you with assistance.

Specific Physical Disabilities Sites

CanDo: disability careers network
http://cando.lancs.ac.uk/
Based at Lancaster University, CanDo is the official British Web site offering specialised careers information for disabled university students/graduates and interested university staff.

Disability Net
http://www.disabilitynet.co.uk/
A worldwide information and news service for all disabled people and people with an interest in disability issues.

Disability Now
http://www.disabilitynow.org.uk
An on-line newspaper with the latest news and useful links including ones on ICT.

The Inclusion Site
http://inclusion.ngfl.gov.uk/
A new site on the National Grid for Learning (NGfL) providing a catalogue of on-line resources to support individual learning needs, and provide rapid, targeted access to a wide range of educational resources and materials. Provides information and resources for teachers working with SEN pupils and aiming to work in an inclusive way, and shows the particular benefits that ICT can offer students.

The Multimedia Enabling Technologies Group (MET)
http://met.open.ac.uk/
The MET group focus on applications of information technology for teaching and learning which draw on innovations in multimedia and enabling technologies.