



Accessing ICT provision for pupils with sensory or physical needs

Learners with physical, visual, hearing or a combination of multi-sensory difficulties may experience problems accessing and using ICT. A student with cerebral palsy, for example, may have difficulty using the standard keyboard or mouse; someone with a visual impairment may find it hard to see and read the screen; students with hearing impairment may be disadvantaged when using multimedia packages that use sound or speech. This Guide outlines the wide range of different adaptations and adjustments that can be used to overcome these barriers. Choosing the most appropriate tool for the job can be complex and in many cases you will need to consult other professionals, such as occupational therapists and specialists, such as your local authority ICT ASN team or the CALL Centre. This guide is concerned with the use of computers: other forms of ICT, such as alternative and augmentative communication aids, are covered in other resources.

Adjust the Computer Control Panels and Settings

Before investigating complicated and expensive access devices or software, try investigating and adjusting the settings in the computer's **Control Panels** first. Different Control Panels are used to adjust different aspects of the computer:

Control Panel	Can be used to:
Keyboard	slow down the key repeat delay and repeat rate
Mouse	slow down the mouse speed; slow down double-click speed; change mouse button actions; change the size or shape of the pointer
Display / Appearance	increase the icon or standard font size and colours
Accessibility Options (Windows)	<ul style="list-style-type: none"> adjust the keyboard response (for students with tremor, or poor accuracy, for example)
Easy Access (Mac OS 9)	<ul style="list-style-type: none"> set up the computer so that the keyboard can be used to control the mouse pointer
Universal Access (Mac OS X)	<ul style="list-style-type: none"> choose high-contrast colours, magnify the screen or use large fonts use visual signals when the computer makes a sound

The Quick Guides and tutorials from CALL and other agencies listed at the end give information on how to adjust and use the Control Panels.

On a Windows computer, you should find the Control Panels in the **Start Menu**; on an OS 9 Mac, in the **Apple Menu**; on an OS X Mac, they are in the **System Preferences** in the **Apple menu** or the **Dock**. If you can't see the Control Panels, it may be because access to them has been restricted by your network software (if you are on a network). If so, contact your ICT Coordinator to get access to them - note that the SEED Guidance on Accessibility Strategies says that such adjustments must be made if required by students with ASN in order to meet Accessibility legislation.

Adjust seating and positioning

Effective seating and support (for example, for wrist, arm or foot) can make a huge difference to comfort, speed and endurance when using a computer, as well as avoiding potential injury. Similarly, it is essential to have the computer screen, keyboard and mouse at the correct height and positioned

to avoid glare. See the references at the end for advice on ergonomics and equipment such as rests, stands and adjustable tables.

Adapt the keyboard and/or mouse

Sometimes a pupil may be able to use the standard keyboard and mouse with relatively minor adaptations:

- **Keyguard.** A keyguard is a metal or plastic plate with holes punched in the surface, that is secured over the keyboard. The keyguard helps to prevent keys from being accidentally pressed while the user's hand moves over the keyboard, so that there is less chance of a key being pressed accidentally. Keyguards are helpful for students with tremor, poor accuracy or weak muscles.
- **Stands.** Stands or rests for keyboards and mice can be very useful to raise the height or angle of the keyboard to a more accessible and comfortable position. Angled rests are available for laptop computers as well as keyboards.
- **Key stickers.** Students with visual or perceptual difficulties may find it helpful to have high contrast key stickers attached to the keyboard. As well as making the letters easier to see, labelling the alphabetical keys on the keyboard can help them stand out against all the other punctuation, function and control keys. Lower case key stickers are available for younger learners.
- **Typing tools.** Students with physical difficulties due to conditions such as cerebral palsy can often find it easier to type by using a "dibber". This can be a pencil, rod or other implement, which is held in the hand and used to press the keys. Some students have very limited control over their arms and hands and may find keyboarding much easier with a head or chin pointer.

A wide range of keyguards, stands and rests are available from Maxess, Inclusive Technology and Keytools.

Keyboard and mouse alternatives

If satisfactory access cannot be achieved using adaptations or adjustments to the standard keyboard, mouse and computer, then you should look at alternative input devices.

Keyboard alternatives

- **Big keyboards** are useful for students who have difficulty pressing the keys on an ordinary keyboard accurately, and also for students with visual or perceptual difficulties. A range of keyboards with different colours and letters are available.
- **Compact keyboards** are suitable for students with limited movement (for example, due to arthritis) or for younger children. They can also be very helpful when you want to put the keyboard in a particular position, such as on a wheelchair tray.
- **Ergonomic keyboards** are available for students who find the standard flat keyboard uncomfortable or painful to use. There are also special one-handed keyboards and chording keyboards for people who only have the use of one hand.
- **Overlay keyboards** (also known as Concept Keyboards) can be very helpful for students with physical, learning or visual difficulties. The student can use an overlay with letters, words, phrases, pictures or tactile signifiers; when the keys are pressed the corresponding text is typed in or action carried out on the computer.



- **Onscreen keyboards** display a "virtual" keyboard on the computer monitor. The student uses the mouse or other pointing device, or scanning and switches to select letters.
- **Speech-recognition system** programs convert speech into text that can also be used to control the computer. Modern programs are accurate and easy to learn but do require dedicated practice before they are effective.

Mouse alternatives

- **Trackballs and joysticks** are often much easier to control than the standard mouse for children with physical difficulties. Students with poor fine motor control may find the larger trackballs or joysticks easier to use, while those with good fine control but limited strength or range of movement should look at small trackballs. Some devices have sockets so that switches can be plugged in to replace the mouse, trackball or joystick buttons.
- **Touch pads** (as fitted to many laptop computers) and special shaped **ergonomic mice** are available for desktop computers and can be helpful for students with a range of physical difficulties.
- **Touch screens** are excellent access devices for children with learning difficulties and, in some situations, for children with physical difficulties. The most effective touch screens are those where the touch sensitive surface is built into the monitor, but touch screens are also available to fit over existing displays.
- **Head and eye operated mice** require good head control but can provide an independent means of access for students with severe physical difficulties. See the ACE Centre review at: <http://www.ace-centre.org.uk/headpointers/headhome.asp>
- **Switches** can be used to control the mouse pointer and buttons. Either the switches are plugged in to a special interface which replaces the mouse, or software is used to move the mouse pointer around.

For more information refer to the CALL Centre book *Special Access Technology* (http://callcentre.education.ed.ac.uk/About_CALL/Publications_CAA/Books_CAB/SAT_CAC/sat_cac.html) and the suppliers listed at the end of this sheet.

Software to improve access

- Programs to develop **keyboard familiarity** and **touch typing** are often helpful for improving student's basic keyboarding skills.
- **Word Prediction software** displays a small list of the most likely words while the student types. Rather than typing every letter of the word, the student can select a whole word with the mouse or by pressing a function key or number on the keyboard. Word prediction can increase the speed of text production and can also help writers with poor spelling.
- **Word bank software** displays whole words or phrases on screen, which the user can select using the mouse or by scanning and selecting with a switch. Most programs can also display a corresponding picture or symbol and can use text-to-speech to help learners with lower levels of literacy. Word banks on overlay keyboards can have additional tactile clues added to the overlays.
- **Braille translation software** This can produce text and Braille versions. Pupils can produce both Braille and standard text printouts for their audiences.

ICT for learners with complex multiple difficulties

Most of the examples given above are suitable for learners with predominantly physical sensory difficulties, where the aim is to provide access to a computer for word processing, browsing the Internet or using other standard software. When ICT is being used for early learning (eg cause and effect) appropriate access is more often provided using touch screens or switches. These topics are addressed in more detail in the ICT advice sheet *A guide to identifying ICT provision to help pupils with cognitive and learning support needs*.

Other forms of ICT

- **Portable tape recorders** can be used to record personal notes, discussions or lectures.
- **Calculator, thermometer and electronic dictionary** are available in versions that have in-built speech for students with visual or reading difficulties.
- **Scanner with optical character reader (OCR) software** offer a means of scanning texts into the computer. The scanned book can then be displayed in a larger font, with particular colours, and text-to-speech software can be used to read it.
- **'Soundbeam' and Midi music processor** can convert body movements or switch presses into sound and music.
- **Voice Output Communication Aids** are available in a large range of types, from simple inexpensive single-message devices, to sophisticated computer-based systems with touch screens costing thousands of pounds.

Sources of help

ICTSLS

In Scotland, most local authorities have a designated member of staff, or team, responsible for ICT and ASN, who is a member of ICT for Support for Learning in Scotland (ICTSLS). You can find out how to contact your local specialist from the ICTSLS list at:

http://callcentre.education.ed.ac.uk/Useful_Links/Useful_Geo_Links/Scotland_ULA/ICTSLS_ULB/ictsuls_ulb.html

CALL Centre

The CALL Centre is a Scottish national agency dealing with ICT, ASN and AAC (alternative and augmentative communication). The Centre's web site has a huge range of downloadable publications and resources; particularly relevant items for students with physical and sensory needs are:

Special Access Technology, which has detailed information on all types of special keyboards, mice and switches. It is published by CALL, and available on-line at

http://callcentre.education.ed.ac.uk/About_CALL/Publications_CAA/Books_CAB/SAT_CAC/sat_cac.html

Quick Guides on a whole range of topics, such as how to set up Control Panels or assess keyboard and mouse devices can be downloaded from the CALL Centre web site at:

http://callcentre.education.ed.ac.uk/About_CALL/Publications_CAA/Quick_Guides_CAB/quick_guides_cab.html

ICTS NOF Training Units

These were written by specialists for teachers participating in the NOF Training developed by ICTS. They are now available for free download from the ICTS web site at <http://www.inclusive.net/resources/units/units.shtml>. All 12 units are extremely useful; the ones that deal specifically with access to computers for students with physical and sensory difficulties are:

Organising your Resources (Unit B), written by CALL gives straightforward advice on basic adaptations to the computer.

Accessing Technology (Unit 7), written by ACE Centre Oxford, covers keyboard and mouse alternatives.

Basic ICT for pupils with a visual impairment (Unit 9), written by RNIB, which deals with access for students with visual impairment.

Other useful sources

BECTa has a range of advice and information sheets on using ICT in special needs and inclusion, at: http://www.becta.org.uk/leas/display.cfm?section=13_1#sn

ACE Centre Oxford (<http://www.ace-centre.org.uk/acemain.asp>) and **ACE Centre North** (<http://www.ace-north.org.uk/index.asp>) are national Centres with a large range of downloadable resources.

AbilityNet is a national charity working in the field of assistive technology and computer access for people with disabilities. Fact Sheets and Skill Sheets on many different topics can be downloaded from <http://www.abilitynet.org.uk>.