

Title: **Universal Access using Onscreen Keyboards**

Author: Gerry Kennedy © February 2009

Software: Virtual and Onscreen Keyboards

Category: Access to text using virtual and onscreen keyboard input



1. Introduction

The majority of software has been traditionally designed for people who use a standard keyboard, mouse and screen display. A student needs good hand control, vision, hand-eye co-ordination, hearing (some programs provide text-to-speech and other auditory feedback) as well as cognitive abilities in order to access most standard and even some special needs software.

This can be a critical barrier to learning for many students with special educational needs. Some will need some form of special access to allow them to use some computer software. Some will require adapted mice, trackballs, head pointing systems or mini or enlarged keyboards. There is a range of external keyboards, modified and programmable external keyboards. In this article, the use of onscreen, sticky or virtual keyboards will be discussed.

A student may require a keyguard consisting of a metal or plastic plate with punched holes, fitted over the keyboard as it reduces accidental key-presses caused by hand tremor. Some users can rest their hands on the keyguard surface to more accurately locate the keys. Microsoft has some access software built into the computer's operating system including TTS and an onscreen keyboard. MAC OS and MS Windows computers have programs that allow users to control the mouse pointer with the keys on the numeric keypad at the right hand side of the keyboard.

If a user has severe physical disabilities which means that keyboard use is either impossible, very tiring, or very slow, then voice recognition, or an 'on-screen keyboard' program which enables the user to select letters and commands using a single switch from a 'keyboard' displayed on screen, may be potential alternatives.

2. Definition and Background

A virtual keyboard is a software and/or hardware component that allows a user to enter characters. A virtual keyboard can usually be operated with multiple input devices, which may include an actual keyboard, a computer mouse, a head mouse, and an eye-mouse. On a desktop PC, one purpose of a virtual keyboard is to provide an alternative mechanism for disabled users that cannot use a physical keyboard. Another major use for an on-screen keyboard is for bi- or multi-lingual users, who continually need to switch between different character sets and/or alphabets.

Although hardware keyboards are available with dual layouts (for example Cyrillic/Latin letters in various national layouts), the on-screen keyboard provides a handy substitute while working at different stations or on laptops, which seldom come with dual layouts. The standard on-screen keyboard utility on most Windows systems allows hot-key switching between layouts from the physical keyboard (typically alt-shift but this is user configurable), simultaneously changing both the hardware and the software keyboard layout. In addition, a symbol in the sys-tray alerts the user to the currently active layout. [Source: http://en.wikipedia.org/wiki/Virtual_keyboard]

3. Benefits of Onscreen Keyboard Access

Some of the features of onscreen keyboards, in isolation or used in tandem, may assist in some students being more independent users of their computers.



Users may require an onscreen or virtual keyboard for a number of different reasons or to achieve a range of outcomes.

They can cater to users and prove beneficial for:

- ✓ Students with short term injuries where typing is difficult or impossible (e.g. due to use of gloves for a burns victim or due to sports related injury)
- ✓ Longer term injuries (e.g. RSI and other over use syndromes)
- ✓ For physically challenged users (e.g. spasticity or tremor)
- ✓ For users with low tone, muscle spasm or permanent injury to hands or fingers
- ✓ Students who fatigue using a keyboard
- ✓ For very proficient mouse or trackball users
- ✓ Proficient joy-stick users
- ✓ For users who use one or more switches
- ✓ For users who have head pointing technologies or other devices that use eye-gaze or other body part access
- ✓ Students who are tactile defensive and do not like the 'touch' of a keyboard
- ✓ Students who have a combination of physical and sight impairment
- ✓ Students and educators accessing Interactive Whiteboards (IWBs)
- ✓ Students and educators accessing touch windows and touch screens
- ✓ Students and educators accessing Interactive devices such as LCD or Plasma TVs

Features that may provide improved or alternate access may include:

- ✓ Lower case and Upper Case Character display – ability to modify and change at any time
- ✓ Enlarged keyboard – ability to increase or decrease the physical size and alter the appearance and therefore performance
- ✓ Different character and language sets – to accommodate LOTE users
- ✓ Different character layouts (DVORAK) – to accommodate different access and skills
- ✓ TTS support – to provide speech feedback to characters, whole words or sentences
- ✓ Word prediction facilities – to speed up text input and assist with spelling
- ✓ Switch access – for one or many switches
- ✓ Head Pointer access – for different models and devices for eye gazing or interaction using controlled body movements, usually using cameras and proprietary technologies
- ✓ Abbreviation and expansion (e.g. in *MS Word*) so that users they can enter text more quickly or with fewer errors

Touch Screen and Touch Window Users

Any touch-screen can be turned into a virtual keyboard with custom designed keyboards or standard layouts.



Touch-screens eliminate the need for keyboards, but what happens when students require need to access the programs running on the school's touch-screen system, either to change something or fix a problem? If they have custom made programs, the programmer may have difficulty accessing those programs without a physical keyboard, wasting valuable time. Schools can't afford the frustration when their students need to use their touch screen system.



Onscreen keyboards provide the necessary input methodology for them to type and gain access to software that requires keyboard input.

4. Commercial, Interactive Whiteboard and Freeware Solutions

a. Commercial Software

SofType V4.2 www.orin.com/access/softype/ (from Origin Instruments)



SofType can be accessed using a mouse or mouse emulator such as the HeadMouse® Extreme. *SofType* is compatible with Windows 2000 and XP as it works by generating an image of a keyboard on the computer screen. When a key is selected, the character represented by that key is sent to the active Windows application.

Features:

- ✓ Text entry is provided for all standard Windows applications
- ✓ Integrated AutoClick™ and Dragger™ features for performing clicking functions by dwell selection
- ✓ Multiple keyboard layouts
- ✓ Word completion with customizable word list
- ✓ Macro and abbreviation expansion
- ✓ Excellent companion for mouse emulators

Keystrokes V4 – MAC OS www.orin.com/access/keystrokes/index.htm (from Origin Instruments)

KeyStrokes is a full function advanced virtual on-screen keyboard that allows you to type with a mouse, trackball, head pointer or other mouse emulator to type characters into any standard MAC OS application.

KeyStrokes software provides advanced multilingual word prediction. Thanks to its PolyPredix™ word prediction engine it can perform word completion, next word prediction and even multi-word prediction in any Roman language as well as many other languages. This proprietary prediction engine offers many unique, time and effort saving features allowing significantly easier and faster typing as it can reputedly reduce typing efforts by 50 to 70%.

Mount Focus Information Systems www.virtual-keyboard.com
(Programmable code to design your own)



These commercial keyboard layouts are available for customising to meet very specific needs. They offer a large range of pre-designed virtual keyboards and they can be downloaded and trialed for up to 30 days.

RJ Cooper – Onscreen for Windows www.rjcooper.com/onscreen/index.html (Shareware) (MAC and Windows)



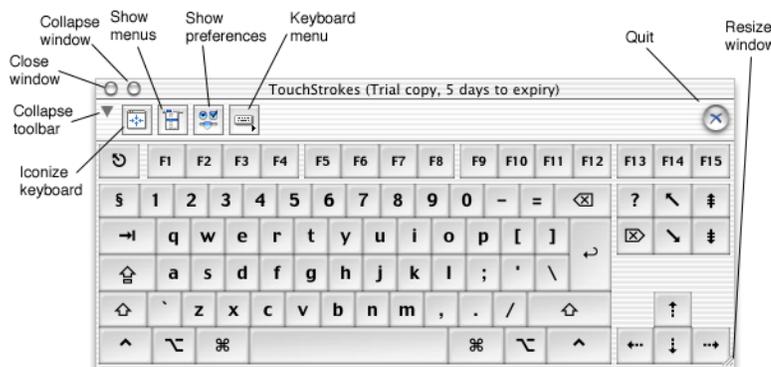
The major differences between it and other on-screen keyboards include:

- ✓ OnScreen has WordComplete, which is not the same as word *prediction*. WordComplete just attempts to complete the word you are working on, whereas word prediction attempts to 'read ahead'
- ✓ OnScreen now has built-in row/ column, 'talking' scanning (1-2 switches)!
- ✓ Suited to students who are vision impaired
- ✓ OnScreen lets you create or add to word lists, from any text source.
- ✓ Suited to a sighted user can use CrossScanner software for 1-2 switch scanning.
- ✓ OnScreen allows users to change any and all colours (Mac OS 9 and Windows versions only).
- ✓ OnScreen auto-arranges windows (Mac OS 9 and Windows versions only).
- ✓ OnScreen has TTS technology built-in (Mac OS 9 and Windows versions only).
- ✓ OnScreen has macro capabilities
- ✓ OnScreen has a large variety of sizes
- ✓ OnScreen lets you edit the WordComplete lists directly
- ✓ OnScreen allows users to set almost any language
- ✓ OnScreen lets you 'hide' keys, for 'early' learners in the MS Windows version
- ✓ OnScreen allows users to launch other programs from within it
- ✓ OnScreen, with one click, moves and auto-arranges between top and bottom of screen
- ✓ OnScreen, when LARGE and too big to fit on-screen, auto-scrolls left/right when you pin the cursor against an edge in the MS Windows version
- ✓ OnScreen works with Vista and earlier operating systems including XP/NT/2000/98/95

TouchStrokes

<http://www.assistiveware.com/touchstrokes.php> (MAC OS)

TouchStrokes provides a fully-functional virtual keyboard for Mac OS 9 and Mac OS X (including Tiger and Leopard) that works by drawing a keyboard image on the display and allows users to type characters into any normal application using a mouse, touch screen, graphic tablet, trackball, head pointer or other mouse emulator. It works seamlessly with all standard Mac applications (including those running in the Classic mode) allowing users to type virtually anywhere a hardware keyboard can be used. TouchStrokes automatically adjusts to US and international keyboard layouts and has multiple resizable keyboard models. It handles command-key combinations, dead-keys, and modifier key - click combinations. It offers a quick access toolbar and has many customizable settings.



TouchStrokes is ideal if students work with a touch screen, electronic white board, or set-up a touch screen kiosk. It is also suitable for art and design students or for artists working with large graphic tablets or server managers that want to eliminate the clutter of having multiple physical keyboards on a desk as this provides a workable and space saving solution. People with disabilities can use the KeyStrokes virtual keyboard, which offers special accessibility features.

TouchStrokes works with any mouse or mouse emulating device that is compatible with Mac OS X. This includes the Wacom Graphire and Intuos tablets and Cintiq displays. It also includes Mac OS X compatible touch screens such as those from TrollTouch or just about any touch screen using the drivers from Touch-Base.

Onscreen

www.imgpresents.com/onscreen/onscreen.htm (MS Windows)

OnScreen is the latest version of the Assistive Technology version of IMG's *My-T-Soft Keyboards*.

OnScreen provides On-Screen keyboard emulation that works with any MS Windows program. The Assistive Technology Version provides a wealth of features specifically designed for use by individuals who can not easily use common input devices. OnScreen provides a powerful interface through any pointing device by providing on-screen keyboards, Word Prediction / Word Completion, user programmable macros, and complete control over all computer functions.



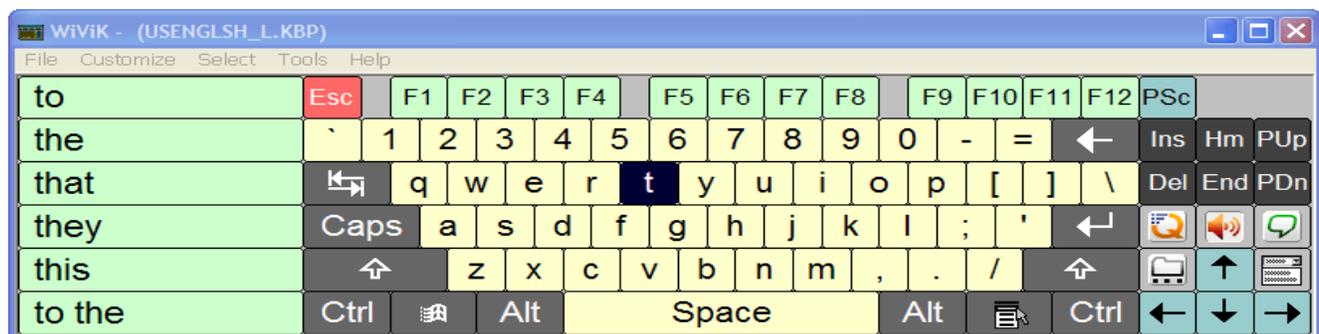
OnScreen uses a concept found in fighter planes, helicopters, tanks, and automobiles. That concept is called "Heads Up Display" technology and its principal objective is to keep the user's focus and concentration centred in one place. OnScreen uses that concept to reduce the visual re-focusing and re-positioning, caused by the heads up and down motion of going from screen to keyboard to screen, and the resulting confusion it causes.

- ✓ OnScreen is used by individuals who need an alternative to the physical keyboard, can use a pointing device or switch, and need an on-screen keyboard as their primary text input device
- ✓ For single switch scanning, there is another version, *OnScreen with CrossScanner*
- ✓ OnScreen US Standard 101 Keyboard Layout with WordComplete / Action Panel

WiViK

<http://www.wivik.com/>

WiViK can help individuals of all ages who are unable to use a physical keyboard, such as those with spinal cord injuries, amyotrophic lateral sclerosis (ALS), muscular dystrophy, and cerebral palsy. Any pointing device or one through six discrete switches may be used as input. There are many alternative pointing devices and switches available in the assistive technology field that work with WiViK. All on-screen (virtual keyboard) keys work just as they would if students were typing on a standard computer keyboard. Students just select a key and WiViK sends it to their word processor, e-mail message, web page or other text-based application that students may be using. Keyboards can contain any keys students want, can be moved anywhere on the screen and can be made any size.



The latest release, WiViK ver. 3.2, provides all-inclusive access in one package:

- ✓ point and click/dwell selection of on-screen keyboard (virtual keyboard) keys with any pointing device
- ✓ unique expanding quadrant selection
- ✓ configurable switch-based scanning (automatic, inverse/step and directed scanning with 1-6 switches);

- ✓ a USB switch connection box is available separately
- ✓ word prediction
- ✓ abbreviation expansion
- ✓ speech output
- ✓ WordQ uses advanced word prediction to suggest appropriate words to make typing with WiViK faster and to help with spelling. As you type, WordQ continuously presents a list of relevant correctly spelled words within the WiViK keyboard. When the desired word is shown, you can choose it with a single keystroke. Speech feedback enables you to more easily choose words and to identify mistakes in all applications. WordQ also acts a text reader to help users proofread and/or read existing or scanned text.

b. Interactive Whiteboard (IWB) – Virtual Keyboards

Different virtual, onscreen or sticky keyboards are available from the manufacturers and distributors of the respective IWB companies. Teamboard, Hitachi, Smart Boards and Promethean all provide a functional onscreen keyboard, usually activated from a menu in their software or from a physical button or icon on the board itself.

The functionality and features vary. They are not essentially designed to meet or resolve disability issues. Rather, they provide keyboard access to finger pointing and stylus input for users who are engaging with and accessing the surface area of the IWB.

c. Freeware

Click 'n' Type V3.03

<http://www.lakefolks.org/cnt/>

Click-N-Type is an on-screen virtual keyboard designed for anyone with a disability that prevents him or her from typing on a physical computer keyboard. As long as the physically challenged person can control a mouse, trackball, touch screen or other pointing device, this software keyboard allows users to send keystrokes to virtually any Windows application that can run within a window. The Click-N-Type Virtual Keyboard is a 32 bit application that requires Windows 95/98/ME/NT/2000/XP/Vista or later.



Users can choose the font and font attributes such as Point Size, Bold and Italic. Note: The two rows of alphabetic keys maximises available vertical screen space while minimizing mouse movement. However, for those students who are accustomed to and proficient with the QWERTY keyboard, they provide a QWERTY layout designed with the CNTDesigner.

The Word Prediction window uses 8 point "MS Sans Serif" font by default. If users have low vision, they can select the font, size and style, using the "Prediction - Set Prediction Window Font..." menu command. Since a larger font requires a larger window, users can resize this window, and its size will be remembered each time they run the Click-N-Type Virtual Keyboard. This is a unique and very powerful feature as it provides Word Prediction for trial purposes or for full-time use.

Windows On-Screen Keyboard part of the Windows operating system (Free)

On-Screen Keyboard is an accessibility utility that displays a virtual keyboard on the computer screen that allows people with mobility impairments to type data by using a pointing device or joystick. Besides providing a minimum level of functionality for some people with mobility impairments, On-Screen Keyboard can also help people who do not know how to type.



In order to access this free technology, follow these steps (Note: If the software is not available, request that it be installed or re-instated by the technician).

On the Start menu:

- ✓ Point to *All Programs*
- ✓ Point to *Accessories*
- ✓ Point to *Accessibility*
- ✓ Select *On-Screen Keyboard*

Note: A message box with a link to more information about the On-Screen Keyboard may appear. To close the box, select OK

Dasher

www.bltt.org/software/dasher/index.htm

The Inference Group at Cambridge University originally intended to create a method of entering text into PDAs and other mobile devices. The result, however, provided a vital alternative to standard On-Screen Keyboards that are used by thousands of people with physical disabilities. Most OSKs have a layout very similar to a regular keyboard only displayed on the screen rather than as a physical group of keys. Dasher is radically different and as a consequence can provide typing rates of up to 39 words per minute (although 20-30 wpm is more realistic).

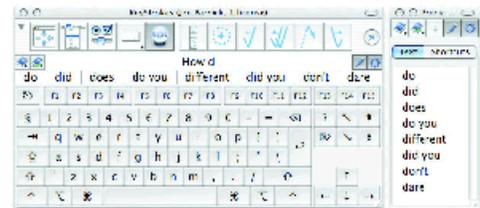
Rather than using static keys, Dasher employs a sort of 'letter stream' where the alphabet flows towards you and you catch your letters as they pass. Actually you're really 'zooming' in to each letter and revealing more letters underneath that will go to form the next character in the word you are typing.

In Conclusion

This article is a brief discussion into some of the issues and implications of sourcing appropriate onscreen keyboards. There is a great deal of choice. Each potential solution offers technologies that may cater to generic or specific access, vision, communication, sensory and/or cognitive need.

It is a matter of trialling one or more programs and experimenting with the size, location, keyboard layout and other functions of the onscreen keyboard. Each has its own benefits and attributes. Users who are vision impaired will require a keyboard that can be enlarged and also choose a different sized font, or coloured font and background. Some onscreen keyboards have abbreviation and expansion options, Word Prediction panels and multiple language support. Others will always "stay on top" and push to the front of all other windows. If you require text-to-speech, then a keyboard that has speech or works alongside a TTS program that will voice all keystrokes or completed words may need to be experimented with and trialled.

As with all technology, the user needs to have time to learn and master the basic functions before longer term viability can be established. If the keyboard is to be used as a form of AAC or communication, then other issues may need to be discussed and more robust software investigated. Other onscreen keyboards and programs that contain "grids", including *Clicker 4* and *Clicker 5*, *Wordbar*, *The Grid 1 and 2*, *CubeWriter*, *No-Keys* and the *Fatali Keyboard*.



Resources:

An excellent resource that has comprehensive information on all types of Onscreen Keyboards can be located at: http://callcentre.education.ed.ac.uk/SEN/5-14/Special_Acc_FFA/On-screen_FFB/on-screen_ffb.html.

Another very informative resource can be located at

http://atrc.utoronto.ca/index.php?option=com_content&task=view&id=52&Itemid=9. This page at the Adaptive Technology Resource Centre discusses the role of onscreen keyboards and lists many of the choices that are available. More information can be found about OSK's at www.bltt.org/software/osk.htm or www.bltt.org/quicktips/keyb_osk.htm.