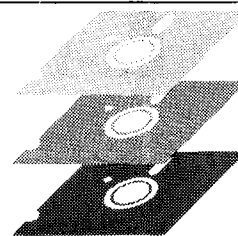


Microcomputer Software Using a Touch Sensitive Screen

Paul Blenkhorn



Paul Blenkhorn, research fellow, Research Centre for the Education of the Visually Handicapped, Birmingham University, discusses the potential value of the 'touch sensitive' screen in teaching visually impaired, multihandicapped pupils.

During the past three years the Research Centre for the Education of the Visually Handicapped at Birmingham University has been undertaking a research project into the use of computers with the visually impaired. Much of the work has been directed towards developing computer based materials for use with the less able, multihandicapped children who are visually impaired, particularly materials to develop visual perception. Many teachers have told us that these materials are also of use for sighted children with severe learning difficulties.

The work described here concerns some recent developments using 'touch sensitive' screens connected to a BBC micro. These screens are frames fitted over standard monitors which enable the computer to detect if and where a user touches the screen. Our programs have all been developed to complement existing materials which are used in the classroom. The programs will mainly be used with children positioned comfortably with the screen at an appropriate height in front of them, and with the teacher seated at the side and, when necessary, using the computer keyboard.

Why use a touch sensitive screen?

When the project first started there was a wide available range of input devices such as MicroMikes, Toy Interface, Boxes and Joysticks which are connected to the computer and which the user operates in order to control the computer. Even though these devices were frequently found useful the problem was that the child was supposed to be looking at the screen, but was operating the device away from the screen. Given a device 'in the hand' some children tended to look at that device. So last year when the first commercially available touch sensitive screen became available interest was aroused. Several of the schools with whom we work closely were also interested and both the research centre and the schools acquired touch screens.

Some initial programs were developed and the results were encouraging. The advantages of using a touch screen were more than obvious with those children

not so physically handicapped that they were unable to touch the screen. The interaction between the child and the computer was focused on one area with everything happening at the fingertips of the child. Cause and effect were almost immediately obvious. The children found this experience to be great fun, and some teachers reported success in engaging children previously unmotivated to use microcomputers.

Problems arising

It would be unfair to suggest that there are no problems in using a computer with a touch sensitive screen. One of the major difficulties is that a 14 inch screen is not a very large area with which the child can interact (the touch screens currently being used work only on 14 inch screens). This restricts the actual range of movements both by the child and by objects on the screen. Users tend to move their eyes rather than their heads. A further difficulty is that the screens which we are using are not directly 'touch sensitive'. They operate by using an array of infra red beams which are projected across the frame. When an object is placed in the beams the computer can detect it and can act appropriately. When the frame is placed in front of a monitor, touching the screen breaks these beams so it appears as if a touch sensitive screen is being used.

This usually works well but there are two problems both associated with the fact that the beams are a little way out from the screen surface. The first is that the beams can be broken without anyone actually touching the screen, although in practice this rarely occurs. The second, and more significant, problem is that if the user's hand goes in at an oblique angle the computer may be a centimetre or so out in its calculation of the spot the user is touching, particularly if the height of the screen is not suitable for the user. Having the screen almost horizontal might help to overcome this difficulty; this is yet to be investigated.

The touch screens available

There are currently two touch screens available — the Cheyne Scribbler (costing about £280) and the Microvitec TouchTech 501 (costing about £220). The Cheyne Scribbler can be more readily used on or off a screen and with a range of 14 inch monitors. However, a way of attaching it to a particular display usually has to be found. In practice it does not react as quickly or quite as accurately as the TouchTech 501.

The TouchTech 501 should, if possible, be fitted to a Microvitec 14 inch metal framed monitor on which it fits firmly. It is both quick and accurate but it is not as suitable as the Cheyne Scribbler for use away from the monitor.

Programs developed at the centre

Twelve discs are currently available from the Research Centre. They will operate with either the Cheyne Scribbler or the TouchTech 501, and some more are under development. The first two are called 'Just Touch' and 'Touch It'. They have been designed for the developmentally young and have a range of programs on them which encourages children to touch the screen. A further disc for the young is the 'Directions' disc which is a modified version of a disc used with a joystick and produced some time ago. The next eight discs contain exercises in visual matching, visual memory and visual discrimination. They cover colour, shape, size, characters, words and patterns. The last two discs, called 'Touch and Match', begin to bring in extra skills such as scanning.

Concluding remarks

There appears to be a good deal of potential in using a touch sensitive screen with the children discussed here. While the materials developed to date have proved useful, we would like to see more being produced. Perhaps the main question in most people's minds is the cost of the device, but those of us who have been using this system believe that the outlay is more than justified.

Obtaining the items

The Cheyne Scribbler is available from Mr John Sanderson, The Cheyne Centre for Spastic Children, 61 Cheyne Walk, London SW3 5LX.

The TouchTech 501 is available from Mr C. Moore, Microvitec, Futures Way, Bolling Road, Bradford, West Yorkshire.

The Research Centre software is available from the Research Centre for the Education of the Visually Handicapped, Selly Wick House, 59 Selly Wick Road, Birmingham B29 7JE.

Acknowledgement

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