

Chapter 1

Introduction to Special Access

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1.1 Introduction

Michelle has just started at her local Primary school. She has cerebral palsy which affects her speech and writing. Alongside traditional paper-based resources, a computer gives her a more independent method of writing. To operate the computer she uses a 'Big Keys' enlarged keyboard and a 'trackball' instead of the standard keyboard and mouse.

Terry is in a Primary 2 mainstream school and also has cerebral palsy. He cannot hold a pen or pencil and employs a mixture of speech, eye-pointing and a computer to do class work. He uses a headpointer to access the keyboard; a joystick instead of the mouse; and scanning and a switch for selecting whole words from lists on the screen.

Claire is eleven and uses a voice output communication aid for personal communication and for contributing in class. Because she is so expert (physically and linguistically) at using the communication aid, she wants to also connect it to the class computer and use it to write, edit and print out work.

Lorna is a fourth year secondary school student studying for her Scottish Standard Grade examinations. She has a visual impairment and uses a voice dictation system for writing, plus a special program to magnify the screen display.

Michael is studying Architecture at University. In second year he had an accident and sustained an injury to his spine. He can access the standard keyboard wearing wrist splints, and uses 'word prediction' to increase typing speed and reduce fatigue.



The above are just a few examples of learners needing some form of special access to the computer. The pen pictures make it sound very simple and successful, but there will have been considerable effort, time and expense spent by all concerned to 'make it happen' in the class. How and why were these particular devices selected for and by these individuals? How are they used in practice? How can they enhance opportunities for learning?

It may be your job to find the best special access solution for such students. Ideally, you want a solution which allows the student to work at the same speed as the rest of the class; doesn't require much setting up or learning (either for user or staff); which works with all the curriculum software used by the rest of the class; and requires the minimum of support. Oh yes, and it should be inexpensive, trouble free and ready to use tomorrow.

Or, it may be your job to support a student using special access in the classroom. You may be responsible for setting up the hardware; for adjusting keyboard responses; for creating and modifying new on-screen grids and for helping the student use the equipment.

1.2 Who is this book for?

Regardless of your experience in dealing with special access technology, we hope that this book will make your job easier.

It's for anyone involved in special access technology... Although the book is aimed at those working within primary and secondary education, anyone involved in special technology should find it useful.

It's for specialist staff involved in assessing and providing special access technology... Technology moves fast and it can be hard to keep up, particularly with some of the more specialised

systems operated by switches, for example. Much of the book is taken up with exploring switch access software and identifying which programs are appropriate for which task, and how the systems can be adjusted to suit the user.

It's for special education co-ordinators, advisors and learning support staff... Those involved with choosing and advising on special access technology should find the book useful for reference as well as staff development. The interactive demonstration programs that accompany the book are designed to illustrate the effects and importance of choosing the most appropriate scanning methods and switch or keyboard responses.

It's for teachers and classroom auxiliaries/assistants... Choosing and setting up the equipment is an easy task compared to using it for day to day activities. There is a chapter on using on-screen keyboards to write, complete electronic worksheets, communicate, and access texts and other sources of information.

It's for parents... Many parents of children with special educational needs are keen to help their children access computers at home, and we hope the book will help them get the most out of the technology.

It's for me (Paul Nisbet) and people like me... People phone and ask all sorts of knotty questions about recalcitrant communication aids, switches, and software on Acorn, Macintosh and Windows computers. I needed a convenient resource where I could quickly remind myself of all the facts that manage to float out of my tiny brain, like: how to turn on Sticky Keys on an A4000; where to buy joysticks for Macintosh computers; whether Windows 95 has optional enlarged mouse pointers built in; and so on...and on...and on...

The book is supplied with interactive demonstration programs which illustrate different types of scanning and keyboard adjustments. The programs can be viewed with Netscape Navigator or Microsoft Internet Explorer 3.01 or later.

1.3 How to use this book

This is a reference source so most readers will be mainly interested in particular topics and chapters. With this in mind, the book can be divided into four main sections:

Chapters 1 and 2	introduce special access and suggest a framework for choosing special access technology.
Chapters 3 through 6	cover adaptations and alternatives to the standard keyboard and mouse, plus voice recognition.
Chapters 7 through 11	focus on more specialised technology for access and education: 'on-screen' keyboards operated by pointing devices or switches.
Chapter 12	gives general information on connecting keyboards, pointing devices and switches to computers, and on speech output.
Chapter 13	collects the references, sources and suppliers listed throughout the book.

Each chapter includes references, suppliers and sources so that individual chapters can be copied and used as self-contained resources.

What's not in this book?

The book is about special access to computers, for students with special educational needs. It is deliberately detailed and specific and is intended to fill a gap between the many excellent

publications that describe IT for special educational needs in fairly general terms, such as *Access Technology: Making the right choice* (NCET 1995a); *IT Helps: Using IT to support basic literacy and numeracy skills* (NCET 1995b); *Access to Words and Images* (Rahamin, 1993); *A practical guide to IT and Special Educational Needs* (Bates, 1997) and comprehensive equipment resources such as those available from the Disability Information Trust (Barrett, J., Herriotts, P. (1995).

As a result, the emphasis is on how a student with disabilities can access software used in the curriculum, not on the educational uses of such software. If you want a shorter, less technical introduction to the topic, look at the publications mentioned in the previous paragraph, and the others listed in the references at the end of this chapter.

This book mentions, but does not cover in detail, other important and related topics such as seating and positioning, assessment procedures, and augmentative and alternative communication. Nor does it contain details on the myriad of commercially available devices such as switches, voice output communication aids, aids to daily living, mobility aids, and integrated systems. Again, for such information you should refer to the publications and web sites listed in the References at the end of each chapter.

The book focuses on technology for physical access: access for people with visual impairments is mentioned but not covered in detail: refer to *Access Technology* (RNIB, 1998) and *Using IT to Support Visually impaired Learners* (Aitken & McDevitt, 1995) for more detailed discussion of technology for visually impaired users.

1.4 What is Special Access Technology?

If you have ever used a computer for wordprocessing, drawing or playing games, then you are already aware that most software is 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 give auditory feedback) and cognitive abilities in order to access most standard and even some special needs software. This is a barrier to learning for many children and young people with special educational needs. Some will need some form of special access to allow them to use computer software.

Adaptations

Some students have difficulties using the standard keyboard, mouse and screen and benefit from adaptations. One example of a hardware adaptation is a keyguard consisting of a metal or plastic plate with punched holes, fitted over the keyboard – it reduces accidental key-presses caused by hand tremor because the student can rest their hand on the keyguard surface to more accurately locate the keys. Another example is access software built into the computer's operating system. For example, Macintosh and Windows 95 computers have programs which let you control the mouse pointer with the keys on the numeric keypad at the right hand side of the keyboard.

Alternatives

If the student cannot use the standard devices at all, you should consider replacing them with alternative hardware or software. For example, if the user has severe physical involvement which means that keyboard use is either impossible, very tiring, or very slow, then voice recognition, or an 'on-screen keyboard' program which enable the user by select letters and commands using a single switch from a 'keyboard' displayed on screen, are possible alternatives.

In this book, we use the term special access to refer to all forms of adaptations and alternatives to the standard devices – keyboard, mouse and screen – that are used to interact with the computer. Over the years, different developers and manufacturers have come up with their own jargon to describe concepts, functions and strategies featured in their products. Where appropriate, we have used the

terms described in the ACE Centre document *A Common terminology for Switch Controlled Software*. (Colven & Detheridge, 1990).

1.5 Who needs Special Access Technology?

Learners who have some hand function or who can use a mouthstick or head pointer to operate the standard keyboard and mouse, but who have one or more of the following difficulties:

- poor accuracy in locating the desired key;
- accidentally pressing keys adjacent to the required one;
- cannot control the mouse with precision;
- cannot do 'double-clicking' or 'dragging' on the mouse button;
- tend to tire easily.

The effects of these problems may be reduced or overcome with suitable adaptations to the keyboard and mouse. People with limited fine motor control may be able to use a larger 'expanded' keyboard, or may be able to use a trackball or joystick instead of the mouse. Those who have good dexterity but cannot reach all the keys on the standard keyboard may be able to use a miniature keyboard.

Students who have very limited control of their limbs or head are not able to use the standard keyboard and mouse. They require radically different input devices and methods, perhaps using a single switch, multiple switches or voice recognition.

Students who are partially sighted or blind and who have difficulty seeing the cursor, text and other information displayed on the screen. Users with some vision may use a larger monitor or software adaptations to enlarge areas of the screen. Blind users can use 'screen readers' to 'speak' the text via a speech synthesizer.

Students with specific learning difficulties or who have spatial or perceptual problems may benefit from the use of a keyboard with a simplified layout (e.g. alphabetic) or with fewer keys.

1.6 References

Aitken & McDevitt, (1995) *Using IT to Support Visually Impaired Learners*. University of Birmingham.

Barrett, J., Herriotts, P. (1995) *Communication and Access to Computer Technology*, C. Thursfield (ed.) Disability Information Trust.

Bates R., (1997) *A practical guide to IT and Special Educational Needs*. Research Machines.

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