COMPUTER TECHNOLOGY FOR YOUNG DISABLED MUSICIANS

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ABSTRACT: The Drake Research Project works with physically handicapped children and young adults, in integrated workshops. It aims to provide facilities to enable participation in music-making for even the severely disabled. It has links with York University Music Technology Department, where a computer-based composition and performance system will be developed and adapted over the next three years for the benefit of those who can only use switches. In London the DRP has links with the Music Department at City University through their post-graduate students. It works with pupils of mainstream schools as well as those with special needs.

The advantages of existing technology for disabled users will be more easily envisaged by members of the ICMC than by many people unaware of the immense changes taking place in the music industry.

Speaking as a non-specialist teacher, or a generalist, I was not aware of the real possibilities when I started to look for ways in which people who are severely limited in movement could enjoy the satisfaction of playing an instrument.

As a person and as Head of Department of Business Studies I realised the importance of communicating, and the importance for young people of being in with their peer group. Computers have become a commonplace in the able-bodied business world, and most people realise their potential for efficiency. Perhaps most people now appreciate how even more important computers are for those who are disabled, particularly for the severely disabled. Software programs can not only facilitate communication for those able to make only a small controlled movement, either through the written word or less satisfactorily through speech, but can also help to control the environment in which people struggle to live independently.

If we are able to provide the possibility of communication in everyday life, music must be included. We are on the edge of being able to provide a two-way process of understanding and creativity, when the experience of language has often been limited either from birth, or through illness, or by accident.

Perhaps I can usefully describe some of the difficulties encountered musically by those who are severely physically disabled. We have a number of students with ataxic cerebral palsy, some of whom are able to speak a little. Some of them are able to move with deliberation and concentration, and can use one or two fingers or one or two toes. One young man whom we worked with in Scotland uses his nose to input data on a keyboard. It can be appreciated that there is usually a problem of using two keys, either on the QWERTY keyboard, or on a mouse, or on a musical keyboard. There is also the problem that when you are struggling with pitch you find it difficult to maintain rhythm, and when you can manage rhythm for example on a drum machine, it is usually, though not always, pre-planned, and the real-time experience of performance remains incomplete.

ICMC GLASGOW 1990 PROCEEDINGS
On the positive side, and despite these problems, music technology as it stands provides some opportunities for music-making previously impossible for anyone who was physically disabled. For the first time it is possible to join others in group music-making without on your own, with the help of appropriate technology, to slowly and painstakingly build up sound.

We shall listen to one or two examples of music from our students later on.

For moderately disabled pupils, it is easy to use a mouse to access a remarkable range of orchestral sounds. It is also possible to play chords as we have seen on MiMidi—even if your fingers refuse to obey your instructions on an instrumental keyboard. Those with ataxic cerebral palsy, who may be hemiplegic, can access sounds from anywhere on the keyboard by the smallest movement of the mouse on the screen. Those who have spina bifida often find it difficult to play with strength, and playing sounds through the computer, or on a synthesizer which is not touch-sensitive, overcomes this difficulty. Pupils with muscular dystrophy, whose physical limitations may mean that their fingers only move across four semitones, can nevertheless press function keys on synthesizers.

One of our early workshops was filmed by Woodfilm for Channel Four and has been shown recently on television in the 'Go for it' series. The documentary film was made about the activities of disabled children specially to show other disabled children what might be possible, given the opportunity. The showing of this film has enabled us to widen our intake and to attract more able-bodied students into the workshops. We now have pupils coming in from the sixth form community studies course at Eltham College as well as from Deptford Green comprehensive, where I taught for a number of years.

I think it is true to say that both able bodied and disabled pupils receive a wider range of benefits from attending the workshops than were first considered, namely:

(a) creativity
(b) communication in music
(c) improving physical skills—see below (case study 2)
(d) social skills

Case Studies

The two founder members of our workshops in London have both made considerable progress in their physical development since the time of the Channel Four programme and I shall ask Mark Rowland, who has ataxic cerebral palsy, uses his right leg to program an electronic drum machine. At a recent workshop in Scotland, where we worked with the Strathclyde Orchestral Productions, Mark produced drum patterns using two drum machines linked to an Akai sampler. He also had the assistance of Stuart McKeil, whose productions are well known in the music business. I would like to comment on this fruitful association between able bodied and disabled musicians, because this is another way in which great progress can be made. Gordon Dougall, who organised the workshops at Opportunity House in Biggar, refers to music as 'medicine for community health'.

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2) Simon Ford, another pupil with ataxic cerebral palsy, composed a piece for 'cello and bass guitars, and this was recorded with the Steinberg Pro 24 software. During the sessions his attention was focused on the screen. Even though he does not hear music in the accepted sense, the written notes appear to act as a reinforcing factor. He uses his left hand to input pitch and then decides on duration. It is noticeable from the point of view of improving physical skills, that Simon now approaches a musical keyboard with care and can pick single notes with greater deliberation. He can even use two fingers and play up to four semitones simultaneously. Previously, because of poor fine motor control, he tended to swing his hand fairly wildly towards the keyboard using his whole shoulder.
CONCLUSION

There remain problems, as undoubtedly there will do till the end of time. We are in the contradictory position of appearing to be at both ends of a continuum, that is to say we are in the vanguard of progress but remain in the dark ages.

We can always see the next step, (and MIDI means never having to say you have enough). In addition we are constantly overtaken by the new piece of wonderful technology. However, in the short term, and working with existing technology, there are still problems: with controlling a mouse or a tracker-ball (as anyone knows who uses a word-processor), or any other interface available so far. If your body makes random and uncontrolled movements, sometimes with strong muscle spasms, then moving a cursor horizontally, vertically or diagonally across a screen with precision becomes frustrating, if not nightmarish.

I think you will appreciate the problem and why we need answers.