A SOUND DESIGN

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The music curriculum in Britain now includes composing as an activity for all children. This can begin in the early years and continue beyond the age of sixteen. In late twentieth century music there is a reawakening of interest in sound itself, rather than emphasis on the relationships between sounds. Can the computer support these changes without building cultural or stylistic limitations into the computer code? A Sound Design describes an on-going curriculum development project involving teachers and children from all phases of education in the production of computer programs and curriculum materials.

Historically the school music curriculum has tended to be the province of a minority of children, those often referred to as 'gifted' or 'musical'. Performing skills have tended to dominate the curriculum, supported by theoretical and historical studies. Yet music is a powerful medium for aesthetic education and should be available to all children, irrespective of age, ability or apparent exclude. Recent developments made possible through new technology can enable everyone to explore and realize their musical thoughts more easily, to be successfully involved in the process of composing.

Music is sound - and it is perhaps essential to start with an exploration of sound itself, not with reassembling ready-made phrases or musical cliches. Music software should primarily enable the exploration of sound, and so lead to the discovery of the nature and effect of different sound qualities. Progressively we should encounter and explore the elements of sound and music - differences of timbre, texture, volume, pitch and articulation. This exploration leads towards the formulation and realization of design in the medium of sound.

The traditional focus on symbols rather than sound has been a feature of music education for many years. But notation itself presents a set of limitations or constrictions rather than a stimulus for breaking new ground. In 'The Musical Mind' (1985), Slonkoda observes that music notation is highly selective and tends to present a closed system within which music can be described, notated, transmitted and understood, but which does not inspire or suggest the essence of educational experience - the joy of exploration and discovery, of making something uniquely one's own.

In this context music technology has sometimes reinforced ossification rather than progression. We have less than ten years left in which to get used to twentieth-century music! So far IT in music, or new music technology, has addressed mainly symbolism - making the traditional (text-based) more acceptable rather than confronting and illuminating musical (sound) making and inventing activities. For many years music, and music in education, has tended to concentrate on only a few limited ways of organising sound, rather than with sound itself. Schools are places where knowledge can be generated, not merely passed on. In 'The Divine Proportion' (1970) the mathematician Huntley has identified three areas of aesthetic appeal:

ICMC GLASGOW 99 PROCEEDINGS 27
- surprise at an unexpected encounter;
- curiosity, a craving to know why;
- wonder, because the conviction grows stronger that we have chanced on an unexplored world, which appears to have no boundaries.

If we are to introduce new technology to the music curriculum it must support this exciting and creative endeavour rather than prop up out-dated practice, or reinforce musical or cultural prejudice. If new technology is introduced to the music curriculum it must be accessible to all children, be curiously exciting, encourage exploration, and the experience of a variety of styles of musical expression.

Any music software for the classroom which demands actual computer programming or specialist knowledge of a computer language must be seen as inappropriate to music education. The QWERTY computer/typewriter keyboard will always be unmusical! Direct action-access to sound is needed at all times. A mouse, tracker ball, touch screen, or joysticks are reasonable input devices at present, but must be supported by clear, unambiguous, appropriate on-screen instructions. These instructions should be kept to a minimum and displayed in an aesthetically integrated way. Simplicity is one key essential. Many music software packages delight in a display which looks like the flight deck of Concorde - complete with matching manual, usually incomprehensible and unfriendly! The computer is a tool which must be usable by all children across the age/ability spectrum. It is vital that musical thinking is not interrupted or deflected by technology, which should enhance, enable and enrich the educational experience.

Any music computer system must:

- produce a good quality sound;
- be affordable;
- be accessible;
- be flexible and not confined to any single manufacturer;
- be content free;
- be musically neutral;
- encourage and develop an enquiring activity;
- work in the medium of sound, not symbol;
- easily integrate with acoustic instruments.

A project, funded by the National Council for Educational Technology (NCET) was begun in 1987. This was concerned with the learning process, music education and new technology. A team of people - including teachers and children from all phases of education - were involved in researching the effect of introducing technology to the music curriculum. This led to the development of a suite of computer programs called Touching Sound. One of the starting points for the software was to make exploring, shaping and making with sound as tactile and direct as possible, rather like the experience of handling plasticine or clay. We made this a direct experience, without any intervening stage demanding instrumental skills, advanced technique, or in having to find one's way around a complex computer program.

With Touching Sound the elements of music can be encountered directly. Timbre, texture, articulation, volume, pitch, all can be accessed immediately, using joy-sticks or touch screen as the physical means of making sound, which is easily created, discovered and explored. New ways of actually playing sound have been included in the program in order to overcome...
but not devalue the barrier of instrumental technique. Although the traditional-looking music keyboard is one way, this can be tuned to a whole range of scales, and can also play differing sounds across its length. Different ways of playing, staccato or legato for example, can sometimes radically alter the quality of sound. Alternatively joy-sticks can be used to play sounds. Perhaps the most accessible way of all is via the touch screen, where we can indeed 'touch' sound! More importantly perhaps, it is a powerful way of bringing a degree of choice and control to the severely handicapped where this has not previously been possible.

The programs were produced for a BBC Master computer with dedicated hardware and were published by NCET in 1990.

A second phase of the project has been started and has led to the further development of this work. A new suite of programs, Designing Sound is currently being trialed in a number of schools prior to publication. Designing Sound is designed to exploit a range of new computers and also synthesizers and Midi keyboards which schools may already have. Initial development has been for the Archimedes range of computers, but we hope to produce versions for Numinus and Atari computers too.

There are two main design functions of the software (see figure 1). The first stage - Exploring, Discovering - provides for a developing understanding and control of sound, played through direct exploration and discovery with sound, not through computer programming. Access to sound is through a number of boxes - which enable timbre, pitch, articulation and volume to be directly explored. From this can develop the ability to imagine a particular instrumental quality coupled with the facility to create it.

Figure 1

DESIGNING SOUND

Wide range of sounds

ENSEMBLE

Tracks 1 - 8

Perform
Record
Transpose
Invert
Review
Cut/copy
Copy

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The second stage - Recording, Composing - is one of application, of having an idea for a product - in this instance a composition perhaps - and working at ways of combining and playing instruments in composing work. This part of the software is called Ensemble. This is a Midi recorder capable of recording up to eight tracks. The essence again is one of simplicity, of technology enabling and extending musical process without interfering with musical thinking. The screen display is kept very clear and simple and actions at the computer remain minimal.

Additional features include transposition, looping, inversion, reversal, and material from the first recorded track can be copied to any other track, or linked to the end of previously recorded music. Children with a range of abilities can easily experience and come to terms with advanced musical techniques in a direct and accessible way. The program is transparent enough for primary children to use, yet encourages advanced musical thinking. Any Midi keyboard or synthesizer can be utilized, including multi-simbral instruments.

Together with the development of this software is a second phase of the project. A team of teachers from all phases of education are developing curriculum materials in support of this initiative. These should be published in 1991.

Some computer programs claim to help people 'compost' music without involving them in a musical process. To be educationally sound, we must ensure that learning happens as a result of personal experience and in a broad musical context.

Technology is not confined to a limited area of human experience, nor need it be inhuman or mechanistic in its application or effect. The essence of good computer programming is one of simplicity, of ease of access, of enabling learning in more direct ways. Learning musical devices, techniques and skills provide enough difficulty and technology can impose another barrier - its particular mode of operation - which sometimes proves an impossible hurdle for teachers and children. This project has explored how technology can lead people to a direct encounter with the medium of music, enabling techniques, processes and concepts to be directly experienced by children of all ages and abilities.

IT in maths has enabled process to be encountered and explored without affecting the nature of the subject. In music, hardware has affected timbre and sometimes reinforced limited or closed musical styles and forms. IT has not always been liberating in a musical sense but has often reinforced the commercial aspect - reflecting where many of the developments originated. This highlights the problem: if music software is designed for the commercial music recording world it is by definition focused on product. Education is concerned with process and demands a different starting point and pathway.

The essence of good education derives from exploration and discovery rather than an encounter with closed systems. As Whitman observes - music is what happens when the instruments remind you.