Electroacoustic Composition: Practical models of composition with new technologies

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This article describes how concepts, technologies and working practices drawn from the world of electroacoustic music have been used to enhance the 'formal' world of music education within a high school in the United Kingdom. Through a series of curriculum projects (Dunwich Revisited and Reflecting Others) the writers examined the processes by which these things could inform and develop new models of compositional practice in the classroom.

Introduction

During the last three years the writers have conducted research into the creative uses of new technologies in music education. The research has come at a time when the use of information and communication technology (ICT) in education has become increasingly important. A number of Government initiatives and funding programmes have been aimed at empowering and equipping teachers to use different technologies within the classroom, encouraging new approaches to pupil learning with ICT. It would be easy to

be cynical about these initiatives, but there is no doubt that they have had a big impact within schools. However, many criticisms have still to be answered. The majority of schools have been flooded with an abundance of new technologies, but there still seems to have been a lack of constructive thought as to how these technologies might actually be used within the classroom to encourage *innovative* approaches to teaching and learning.

Within the field of music education there has been a general acceptance of some of these new technologies. An average high school music department would contain a number of computers (normally PCs) and a variety of other pieces of technology, including multi-track portastudios, keyboards, amplifiers and microphones, the odd drum machine and effects processor. But from our observations we have noticed a number of worrying traits about the uses of these technologies as educational tools.

Firstly, technologies are often only used by teachers and pupils as presentational tools. For example, pupils may be taught to use a piece of software designed to produce professional quality musical scores (e.g. *Sibelius* or *Finale*). There is nothing wrong with this in itself. The presentation of a score in this example is often something *extrinsic* to the act of composition. Our interests lie in addressing uses of technology that are *intrinsic* to the act of making music.

Secondly, there seems to be an unhealthy emphasis on the use of technologies that rely exclusively on MIDI within high schools. In some respects there is nothing amiss about

this preoccupation. MIDI is a highly flexible and powerful system for controlling all aspects of electronic sound. However, within schools MIDI seems to have become synonymous with keyboards linked to sequencing software. Recent research by the Fischer Family Trust suggests that for 75% of high school pupils this is their primary means of performing and composing with ICT. In this example pupils are relying on a 400-year-old interface (the keyboard) for accessing the sounds contained within a computer! In the lessons we have observed, pupils' keyboard skills (or lack of them) have played a fundamental role in their own and their teachers' judgement of the 'success' of their work. Primary importance is attached to the controlling of pitch and time parameters, neglecting an understanding of musical composition beyond these traditional elements. There has been a complete failure to understand the strengths of the technology available in the classroom for other more creative musical applications.

To summarise, having reviewed the use of technologies within music teaching in the UK and the USA, we would say that there has been little exploitation of new technologies outside those uses that perpetuate traditional compositional models within music education. These models primarily concern themselves with the skills associated with tonal, often notated, music and, on many occasions, use the keyboard as the main interface for playing and arranging computer-based (General MIDI) sounds.

Our research has broken new ground by exploring digital technologies in the classroom within the 'electroacoustic' tradition of composition. This field provides a plethora of performance and composition styles, giving a rich environment applicable for educational

use. A key ingredient of the research has been a focus on the ways in which postgraduate electroacoustic composers at the University of East Anglia use new technologies in their own compositional practice. We have sought to develop and apply these models of compositional practice within our teaching. This has meant us using a variety of technologies seldom seen in UK classrooms before. As we hope to demonstrate, pupils have made a range of innovative and exciting performance and installation outcomes, as well as learnt a variety of new strategies and methods for compositional practice.

Spheres of Influence

Technological Influences

Throughout our research, we have observed that music technologies can engage pupils in a greater sense of direct experimentation with sound. A number of examples can be given. In an early project, *Dunwich Revisited*, pupils used sound processors and microphones as tools for the manipulation and transformation of sounds in real time. Pupils used their voices and a range of traditional musical instruments to create sound ideas that eventually became part of a performance piece describing the history of Dunwich, a once famous port on the east coast of Suffolk. The basic dials on the front of the sound processor facilitated an immediate and direct exploration of the various effect

parameters. They seemed to liberate pupils from conventional musical stereotypes in their search for new sounds.

Similarly, in *Reflecting Others*, a more recent project, pupils used the effects palette within *Metasynth* to transform a number of samples that they had collected into new sound ideas. The simplicity of this software allowed them access to real time transformation of digital samples in an amazing way. It inspired pupils to create an electroacoustic piece that drew much public acclaim as part of an installation at Snape Maltings (a local concert hall) during the 2001 Aldeburgh Festival.

Linked to this increased sense of experimentation, was the technology's influence in widening pupils' perceptions and assumptions of what constituted appropriate musical and, specifically, compositional activity. Many pupils have strange ideas of what a composer is and what it is they do. And perhaps some of them are justified! But through allowing pupils access to some of the very same technologies that electroacoustic composers use, and modelling a variety of 'authentic' compositional processes for them to follow, pupils could experience similar aesthetic and compositional issues that other composers face. Pupils had access to the very same tools that electroacoustic composers utilise. In many cases these tools did not rely on the traditional instrumental skills that much classroom-based music education presupposes as a knowledge or performance basis for musical activity. As such, these technologies democratised the performance and compositional process, giving all pupils the chance to participate fully. It was interesting to note throughout these projects that many of the pupils who seemed to benefit most

from the work were those pupils who may have lacked the traditional skills associated with musical success by previous generations.

Finally, these new technologies empowered pupils to express their own ideas in unique and powerful ways. The types of compositional tasks and activities employed within these projects also had an influence here. Typically, compositional tasks were open-ended and allowed an extremely wide range of creative responses. The widening range of sounds facilitated by these technologies matched the nature of the tasks very closely. Hence the technologies empowered the pupils with the tools for a heightened personal response within the framework of the classroom work.

Compositional Processes

Composers' working practices are too often shrouded in secrecy and mystique. Pupils are very interested to find out how they work. In an attempt to bridge this gap, compositional processes employed by electroacoustic composers in their own work were adapted for use by pupils within the classroom. An example of this is a simple, yet authentic, compositional process that pupils followed:

STARTING POINT - EXPERIMENT - SELECT - STRUCTURE - EVALUATE/REVISE
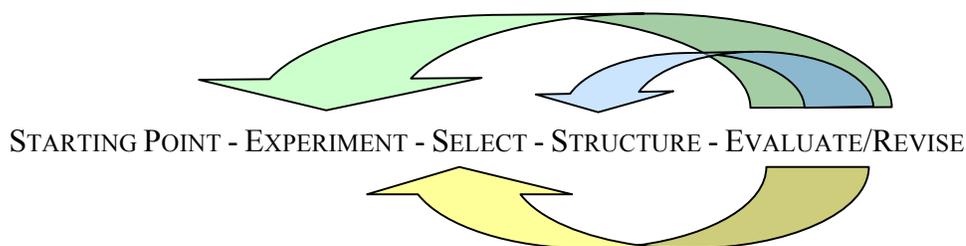
The five staged, circular compositional process illustrated above was a feature of all the curriculum projects. Although it is presented in a linear format, the loop back from the evaluation component to previous stages is very important, turning a linear into a compound process. Moreover, the process can be applied to the many 'levels' of compositional practice. It could relate to the recording of a single sound, the process of selecting and editing collected sounds, or the structuring of them into pieces.

This diagram formed part of a wall display that pupils referred to regularly as part of their work. It represented a series of 'handles' for them, providing a sense of progression and security within the compositional process. Rather than composition being seen as a mystical process or divine experience, this chart provided a clear framework for pupils to follow.

Compositional Metaphors

How can teachers encourage their pupils to create and manipulate sounds in interesting ways? One successful way that we utilised was through the idea of 'compositional metaphors' (see Appendix 1), based on work done by Dr Waters and his 'Keywords: a toolbox of productive metaphors' (Waters 1994, pp.73-97). The chart displays compositional metaphors, illustrated with the elements of music, under the overarching

question, "How can I put sounds together?" Each metaphor is situated around a group heading ('By connecting' and 'By reducing') and can be used as a stimulus for a compositional task, with or without technology.

As pupils accumulated a variety of compositional tools from this selection (and often they invented new ideas of their own which we added to it!), so their means of expression increased, as well as there being an expanded repertoire of ideas for structuring and sequencing sounds. Pupils begin to use combinations of these metaphors as they attempted larger compositional tasks.

The 'elements of music' have been an important aspect of the National Curriculum for Music for many years. Teachers and pupils are used to talking about and appraising music in relation to its constituent parts such as pitch, duration, texture, timbre, structure, etc. When adopting a range of electroacoustic music and associated practices within the classroom it soon became apparent that such terms quickly become inadequate, only partially explaining the new sound worlds that can be created. The compositional metaphors were an attempt to bridge the gap and empower pupils with the necessary literal and musical vocabulary to create and describe their sonic gestures and forms.

Expanding Curricula

Music education within school has become thoroughly institutionalised and, unfortunately, a strictly defined discipline that finds it hard to break out and make links with other art forms. But the ability to make links across the arts through common digital processes is one way in which our research has broken out of this straightjacket imposed by the National Curriculum. *Reflecting Others* was one example of this, drawing on common manipulative processes from sonic and visual software environments (Digital Performer music and Adobe Premiere for video). The metaphors described above provided a common language for the sequencing and structuring of sound *and* visual ideas. The project's themes of identity, community and environment provided the conceptual links for pupils working with sound or visual materials.

Similarly, the variety of approaches to composition that electroacoustic composers adopt has proved a rich vein of support in seeking to expand notions of composition within the classroom. Take the Acoustic Ecology movement as one example:

> There is a great need for more soundscape-orientated activity and awareness within the music education sector.… Using computer and recording technology we are able, not just to listen and appraise the sounds around us, but to sculpt with this sonic material. (McGinley 2001, 72)

In the United Kingdom soundscape and acoustic ecology approaches to composition have been under-researched and utilised by classroom practitioners. These projects show that a creative approach to curriculum planning gives pupils the opportunity to reflect sonically on physical places, their own and others environments in powerful and authentic ways.

These projects represented an attempt to implement technological and pedagogical strategies that enabled "our young people not only to have the opportunity to become soundscape researchers, but [also] soundscape designers" (ibid. p.73). Acoustic ecological approaches within classroom composition bridges the gap between the demands of the formal curriculum and the personal values and experiences that pupils bring with them to the classroom. Young people's ability to reflect on their own lives and the lives of others inspired creative responses.

Formal and Informal Learning

There are many challenges ahead for music education in the 21st century. Developments in music technologies and their uses are moving on quickly and music education needs to keep up. Failure to do so could spell disaster. Pupils will not be satisfied with what is on offer within the 'formal' music curriculum if what is available at home for them on their personal computer, playstation or via the internet is much more exciting, relevant and inspiring. And whose to say that their individual or collaborative musical learning in these 'informal' environments may not be equally advanced and sophisticated as their 'formal' classroom-based learning, or more so? Lucy Green's recent book (Green, 2001) presents us with such evidence from the field of instrumental music. As her final chapter states, formal and informal learning environments may be 'mutually reciprocal or contradictory'. This depends on an individual teacher or pupil's point of view and how they decide to act on it. As educators within the 'formal' context, the ball is most firmly

in our court. One can stay with past models of musical practice that exploit old (and often genuine) uses of musical technologies. Or one can try our to embrace change, examine carefully the new models of artistic practice that are happening today and facilitate the innovative uses of old and new technologies in such a way that truly inspires and motivates all our pupils.

Where Next?

Recent NfER research has suggested that 'enjoyment, relevance, skill development, creativity and expressive dimensions' are often absence from pupils' experiences in music lessons (Harland et al, 2000, p.568). In light of comments like these it was encouraging to note positive pupil reactions to their work in these projects, particularly their comments relating to the creative process and originality of the end products.

The NACCCE report defines creativity as 'imaginative activity fashioned so as to produce outcomes that are both original and of value' (NACCCE, 1998, p. 30). It outlines a four-fold model of creativity, the first stage being:

> … thinking or behaving imaginatively. Second, overall this imaginative activity
> is purposeful: that is, it is directed to achieving an objective. Third, these
> processes must generate something original. Fourth, the outcome must be of
> value in relation to the objective.

Karen Dust, in an excellent review of the literature on creativity for the National Endowment for Science, Technology and the Arts, presents a number of other definitions of, and processes for, creativity. These are summarised under a general definition of creativity being 'a creative product produced by a creative person as a result of a creative purpose' (Dust, 1999, p.2). Quoting Howard Gardner, she discusses the idea of a 'crystallising experience' in the development of talent and ability. These experiences link people with the materials of a field in such a way that strengthens interest and increases understanding. Crystallising experiences can only occur, she suggests, if the right opportunities are presented (p.16).

This research has placed the creative ideas and experiences of young people at the heart of a creative process. The final products of the research, the pupils' compositions, performances and installation, are not just a reflection of their views of others, but also reflections on themselves. Technologies have only been tools or vehicles for their imagination. As they have employed them in various creative tasks, imaginations and experiences have been stretched and challenged. Used in an appropriate way, they have empowered them with the skills needed to express and communicate feelings about themselves and others. For some pupils this has led to a redefining of their own views about other people, both within and outside their normal range of experience. As teachers, we hope that for some young people this has been a crystallising experience. Whilst we would question NACCCE's assumption regarding the centrality of an

objective in the creative process, the quality and definition of clear starting points in these projects had a critical effect in relation to how pupils' structured and valued their work.

Burnard suggests that a pupil's willingness to compose is facilitated by creating an environment within which they can express their creativity. The closer these activities are to pupils' immediate experiences the greater the potential for creative responses and processes to occur. In these projects, digital technologies have facilitated this creative and critical process thereby providing an opportunity for increased musical learning.

> For learning should be perceived as meanings negotiated amongst learners as well as between learners and their teachers. Teachers should, therefore, try not to impose their values but rather encourage the children to discuss and develop their own. Our aim should be to facilitate a form of music education that focuses on genuine experiences of children *being* improvisers and composers rather than acting out a pre-defined model. Subsequently, we must encourage and assist the children to think critically and creatively. (Burnard, 2000, p. 21)

We see in this research tentative movements in the direction of a music curriculum that places an emphasis on creativity with new technologies within a cross-curricular context. Developing this creative approach is an ongoing challenge and one that relies on a consideration of a number of pedagogical issues:

> Teachers need to choose a context of relevance to young people's lives, select an interesting challenge and ensure that pupils have the necessary artistic skills.

Providing choice, ensuring autonomy, encouraging teamwork, allowing

experimentation and encouraging perseverance are key components of fostering

creativity within the arts. (QCA, 2000, p. 9)

The opportunity for teachers and pupils to work with a greater degree of autonomy,

empowered with the evaluative tools for effective reflection on their artistic practice, are

vital strands throughout this research. Collaborative activity between schools, arts

agencies and other bodies (even universities) has a long tradition of providing

'educationally rich' experiences (Kushner, 1994 quoted in Swanwick & Lawson, 1999, p.

59). Our thanks go to all our colleagues who have made this work possible. To conclude,

we challenge any of you who work within the field of electroacoustic music and would

like to develop educational dimensions in their work to take the plunge into the murky

world of music education. Opportunities for creative partnerships are there and your ideas

and experiences are desperately needed.

Appendix 1

How can I put sounds together?

$\left(\text{By Connecting}\right)$ $\left(\text{By Reducing}\right)$ $\left(\text{with elements}\right)$

layer   emerge

transform

    bridges

repeat streams

    build up

fading

    pile up

growing

    blending

loops

    disintegrate

disappear

drift away   breakdown

select   edit

    overlap

filter

    pauses

masking

    drag out

silence

    segregate

    overpower

pitch   tempo

duration   texture

    timbre

    dynamic

structure

    silence

Revise

Starting Point   Evaluate

Experiment

                 Structure

Select

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