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A Digital Arts Curriculum? Practical ways forward

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ABSTRACT Reflecting Others *was a collaborative digital arts project run between December 2000 and March 2001 by Aldeburgh Productions, Debenham Church of England Voluntary Controlled High School and Her Majesty's Prison (HMP) Hollesley Bay. Students and young offenders used a variety of digital technologies to collect sonic and visual material relating to the project's central themes of identity, community and environment. Having exchanged these digital 'scrapbooks' of material, each group used the material collected by the other group to make a series of music and video compositions. These were placed within a specially designed installation. This article shares insights from this project drawn from a range of qualitative data collected by the then Head of Music Jonathan Savage and Mike Challis, an electroacoustic composer who is also a member of the school staff. The authors are interested in establishing the idea of a creative 'digital arts' curriculum. They seek to address the need for an appropriate model of compositional practice within such a curriculum. They draw on their observations of students working with these technologies, as well as analysing their students' views on using technologies as tools for sonic and visual composition.*

Introduction

> There are many more ways of expressing yourself rather than just talking. (Year 9 girl)

> Music is the pretext—life is the text. (Kushner, 1999, p. 216)

Music lessons for students in Years 9 and 10 at Debenham High School have been far from conventional during the Autumn 2000 and Spring 2001 terms. In them, you would have been as likely to find students working with digital video cameras, iMac computers, MiniDisc players and microphones as with traditional classroom instruments. You would have found students recording the hustle and bustle of school life, the countryside, their hobbies and interests, collecting audio samples from CDs and radio programmes as well

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as visual images from the local skateboard park and leisure centre. In another part of Suffolk, within a highly secure special unit, young offenders were offered the opportunity to carry out a similar exercise. Both students and young offenders have documented, through sonic and visual digital recordings, their environment, sense of identity and community as young, 21st-century teenagers. After the collected materials were exchanged, they become source materials for a number of sonic and visual compositions each made by one group about the other.

This work, *Reflecting Others*, is an innovative digital arts project that has, at its heart, the idea of representing oneself and others through sound and image. The project has linked students in Years 9 and 10 (aged between 13 and 15 years old) with a small group of young offenders (aged between 15 and 18 years old) in the Carlford Unit at HMP Hollesley Bay. Whilst the project involved the whole of Year 9 (approximately 84 students with a full range of musical ability) and a few year 10 pupils and took place entirely within designated music curriculum time, the prison's group of young offenders was much smaller (approximately 12) and made up of volunteers. The school students did have some prior experience of using information and communication technologies within their regular timetabled music lessons of 1 hour per week (see Savage & Challis, 2001). The young offenders had little or no experience of this prior to the project and worked within a designated 2-hour session on a Friday afternoon. The project was organised by Aldeburgh Productions' Education Department and funded by The Monument Trust, with additional support from the J. Paul Getty Jr. Charitable Trust.

This paper is a reflection on the project itself. Within it, we hope to convey the essence of the work from the viewpoint of the school, its staff and students. The paper does not attempt to document the experiences of the young offenders throughout the project. It considers the project in light of recent government exhortations for teachers and students to use new technologies as tools for teaching and learning. Within the realm of the music curriculum it seems clear that information and communication technologies (ICT) can be used in two ways: they can function as tools to facilitate models of composition extrinsic to the technology itself (for example, using MIDI instruments or samplers to emulate a traditional instrumental piece); or it can be used to generate an entirely new model of composition practice, one that allows a greater exploration of sound itself. The *Reflecting Others* project falls clearly into the second of these types.

It would not have been possible for students to work within this project without the digital technologies employed. We are keen to develop and promote the idea of a digital arts curriculum. What exactly this curriculum might look like is open to debate and further research. But we see in this project 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 students 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. (Qualification and Curriculum Authority (QCA), 2000, p. 9)

The opportunity for students to work with a greater degree of autonomy, empowered with the tools for effective reflection on their artistic practice, was another important element in the project. The choosing of a relevant series of starting points was also vital.

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Collaborative activity between schools, arts agencies and other bodies has a long tradition of providing 'educationally rich' experiences (Kushner, 1994 cited in Swanwick & Lawson, 1999, p. 59). We would echo these comments made about previous projects and say that this project, too, 'stimulated us to go beyond where we were at the beginning' (ibid.).

Research Context

> Those who teach the arts have less resource than anyone else but more freedom… (Stake cited in Kushner, 1999, p. 216)

Stake's observation has certainly proved true in the context of this research. The project benefited from funding obtained from external sponsors, but this funding was granted because of Aldeburgh Production's collaboration with HMP Hollesley Bay, not because of the school's involvement. All incidental expenses incurred by the school (in allowing staff to attend sessions at the prison) were paid for through this sponsorship. Most of the ICT used in the project was purchased by Aldeburgh Productions and has subsequently been withdrawn from the school. However, what the school has provided is a research context that is open to new and experimental ideas. This fact should not be understated. Music education on the 'fringe', as Kushner calls it, can be intensely rewarding for all involved. It is from teaching and researching at the fringes of the music curriculum that new knowledge and ideas can be produced. We have sought to exemplify an interactive form of research that, whilst taking account of ideas and theories, is primarily built on 'observations of educational practice' and focuses on 'the individual and the idiosyncratic' (Kushner, 1999, p. 217).

It is our contention that this approach to teaching and research is the most useful in providing an accurate picture of learning with new technologies. It produces an account of the process within the context of a specific classroom, framed by the social, cultural and political context of the school. This 'inside-out' approach has the additional benefit of empowering the teachers' voice, enabling one to reflect on the interactions and relationships in the classroom with a degree of intimacy that is not attainable through other methods.

Description

> A central challenge for the education system is to find ways of embedding learning in a range of meaningful contexts where students can use their knowledge and skills creatively to make an impact on the world around them. (Seltzer & Bentley, 1999, p. 10)

In the half term before Christmas 2000, students and young offenders used a variety of digital media (predominantly MiniDisc players with stereo microphones and a digital video camera) to collect sonic and visual material related to the project's central themes of identity, environment and community. This material (over 20 gigabytes in total) was recorded onto a number of iMac computers before being edited and transferred to external hard disks. The school and prison exchanged these disks after Christmas. Students then worked on the material collected by the young offenders; the young offenders worked on the material collected by the students. They selected, edited and manipulated the images and sounds using a variety of innovative software tools, including Metasynth (a software-based sampling environment), Digital Performer (an audio editing and mixing program) and Adobe Premiere (a video editing and mixing

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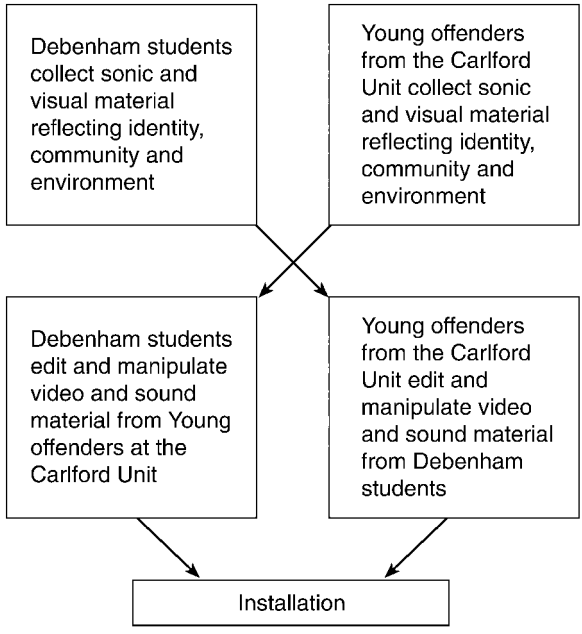

FIG. 1. Diagram representing the exchange of material.

program). Each of these pieces of software, despite being tools for professional use, was easily adapted to use within the classroom environment. The sonic and visual compositions produced were arranged to make a specially designed sound and visual installation, which was housed in the Exhibition Room at Snape Maltings Concert Hall. The installation was transferred to the school and the prison before returning to Snape Maltings for public viewing during the 2001 Aldeburgh Festival and Snape Proms. Figure 1 illustrates the exchange of materials that was at the heart of the project.

Key to the success of the project has been the involvement of two artists: the electroacoustic composer, Mike Challis and the film-maker, Dan Farncombe. Both worked in the school and the prison, combining and sharing their technological skills and artistic awareness with groups of students and young offenders. Like the *ConCussion* project (Higgins & Ross, 2000, p. 91), they adopted an approach to teaching with digital technologies that concentrated more on what they could achieve rather than how to accomplish a given task with a specific software tool. They promoted an approach to using new technologies that focused on developing students' creative ideas rather than getting weighed down with the intricacies of the software.

Compositional Issues

The Composition Process

A specific compositional process was an important element within the project. This process has been derived from discussions with electroacoustic composers, particularly Mike Challis, and is a simple, five-staged process. It consists of:

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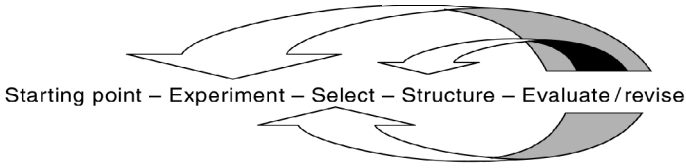

Students' work in composition at the school has been framed around this process over the last 2 years. The *Reflecting Others* project was neatly divided across the Christmas break. Prior to Christmas, students and young offenders developed creative starting points, experimented and collected appropriate material; after the break they worked on selecting, structuring and evaluating this material.

Although this composition process is presented in a linear format, the loop back from the evaluation component to previous stages is very important. This results in a compound process rather than a simple process of accumulating or structuring material. Moreover, the process can be applied to the many 'levels' of compositional practice. It could be related to the recording of a sound, or the process of selecting and editing these sounds, or the structuring of them into pieces.

This process has provided a series of 'handles' for the students' work with throughout the project. It gave them a sense of progression within the compositional process. Rather than composition being seen as a mystical process or experience, this chart provides a simple yet authentic sequence of activities for them to follow.

Authentic Composition Skills

Of constant interest to us as researchers were the types of skills the students needed to develop when using these technologies within composition tasks. Students needed to develop the skills to use new software effectively and to familiarise themselves with a new computer operating system (for many this was the first time they had used an Apple Macintosh computer). Interestingly, students handled the change with minimal fuss or problems.

Some students clearly made a link between the computer as a tool and the possibility of the computer as an 'instrument'.

> I think if you work a lot on your skills with the software you'd get it better like an instrument. You know what sounds you are looking for and pick them out quicker. (Year 10 boy)

Alongside the development of technological skills come the compositional skills of selecting sounds. This student suggests that as his operation of the computer becomes, in a sense, more automatic, he can work more quickly on the important process of choosing interesting sounds. The aural skills needed to select the appropriate sounds are considerable. He has identified them as a key skill. As a composer, the selection and structuring of sounds from a period of extensive experimentation or play is a vital link in the compositional process.

Technology as an Aid to Experimentation

> You can experiment with it. If you don't like the sounds you can change them without changing the whole lot. (Year 10 girl)

The use of mixing/editing software (Digital Performer) and editing and transformation software (Metasynth) in the project has enabled students to manipulate and structure material easily and effectively. When the firewire hard disks were exchanged after

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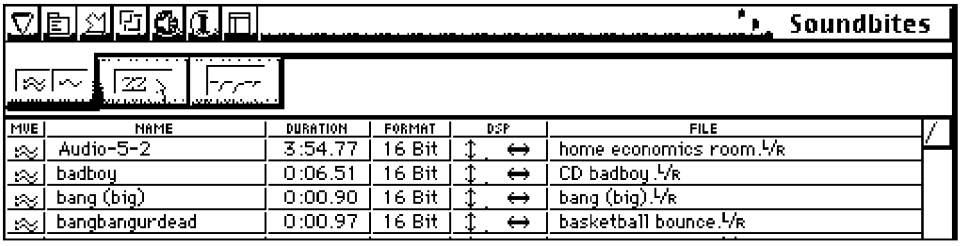

FIG. 2. The Soundbite window.

Christmas, students faced the task of watching and listening to the large amount of material that the young offenders had collected. They had to make artistic decisions about what to keep, what to store for possible future use, and what to throw away. From this wealth of material, students selected particular sounds and images that they felt were especially striking:

> I think that the images of the bars were effective because they were so simple, but it meant a lot to them and show us a lot about their life. Also the clips of the chapel were quite interesting to have seen from a prison. (Year 9 girl)

In relation to sonic material, Mike Challis talks about this process of selection as enabling one to 'build your own instrument'. Within the Digital Performer software, collections of audio clips can be stored in the Soundbytes window (Figure 2). You can play sounds by simply clicking on them.

One can also open soundfiles from this location, highlight part of a waveform and then save the selected waveform as a new soundbyte (Figure 3).

Quite literally, one is building a library of sounds which can then be structured, arranged, repeated or edited as appropriate within the 'time line' of the composition as portrayed in the Mixing window. One can create a virtual instrument. Digital Performer is similar to a number of other software packages, like ProTools, Logic Audio and Cubase, in utilising a graphical interface to enable audio files to be moved within the mixing environment. Students can easily arrange and structure their musical material within this environment (Figure 4). The same was true when students structured the video material using Adobe Premiere.

Students became very adept at building up these collections of soundfiles within their various projects. They were also able to take audio files out of the Digital Performer environment, manipulate them in Metasynth and then reintroduce them into the Soundbyte window. Metasynth's graphical approach to dealing with soundfiles proved particularly versatile as a tool for editing and manipulating sound ideas (Figure 5).

In this sense it confirms and extends Swanwick's comments by turning sonic material into visual metaphors too.

> But the computer can also be used both to stimulate compositional processes and to facilitate editing and notating. It can also translate visual metaphors of music into sound. (Swanwick, 1999, p. 108)

Using the Environment to Make the Music

Reflecting Others has used sonic and visual material taken from the students' and young offenders' actual environments. Three starting points (identity, community and environment) defined the process by which they selected material. Occasionally it was a struggle

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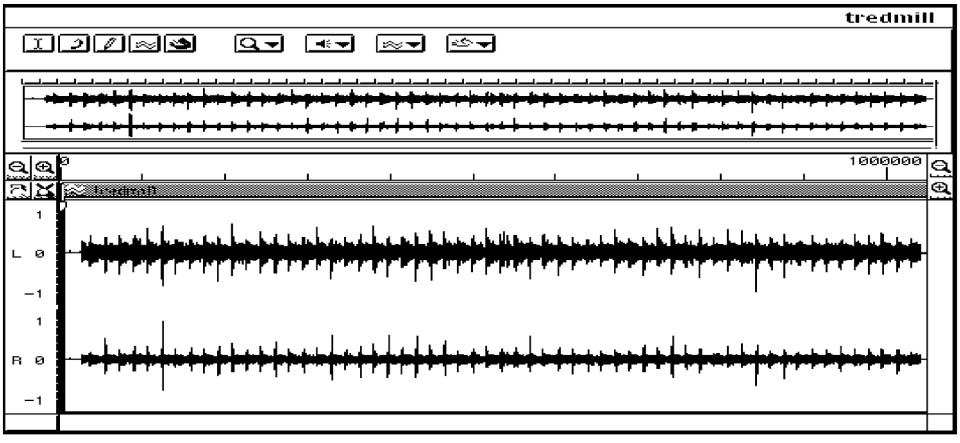

FIG. 3. Example waveform.

to get the students to think clearly about each of these. As expected, we had a range of students' responses to these starting points. As project leaders, we continually found ourselves in the position of wanting to advise and lead students in making interesting and informed responses, without forcing them into predetermined and predictable ones. Some students' responses never got beyond the initial and obvious sounds and images. Other students were creative in the way in which they responded to representing their ideas of identity, environment and community through sound and image.

The use of digital technologies was essential as a tool for gathering the material related to these responses. Students were able to use the MiniDisc player and digital video camera to collect material from any environment they chose, and subsequently to use it as source material for their pieces.

Student Issues

Widening Perceptions and Challenging Assumptions

> At first I didn't think this was anything to do with music. It was all ICT. When you think of music you think of people playing instruments. When you get into it you realise that it's not just that. It's just another way to look at music. (Year 10 boy)

Unlike previous research carried out at the school that had a live, performance element and utilised traditional instruments and singing (Savage & Challis, 2001), within this project students were working entirely with recorded material in a digital environment. From this perspective it was pleasing to note a change in some students' attitudes towards their work. Whilst in the first instance there was a focus on effective use of software and hardware, and in developing the necessary technological skills, students were quickly encouraged to use the various technologies as tools for a creative purpose. In many ways, and mainly because of time restraints, students were thrown in the creative deep end with some of the technology. They had to sink or swim with it and, to our delight, many rose to the challenge and quickly showed their creative flair through appropriate uses of the software.

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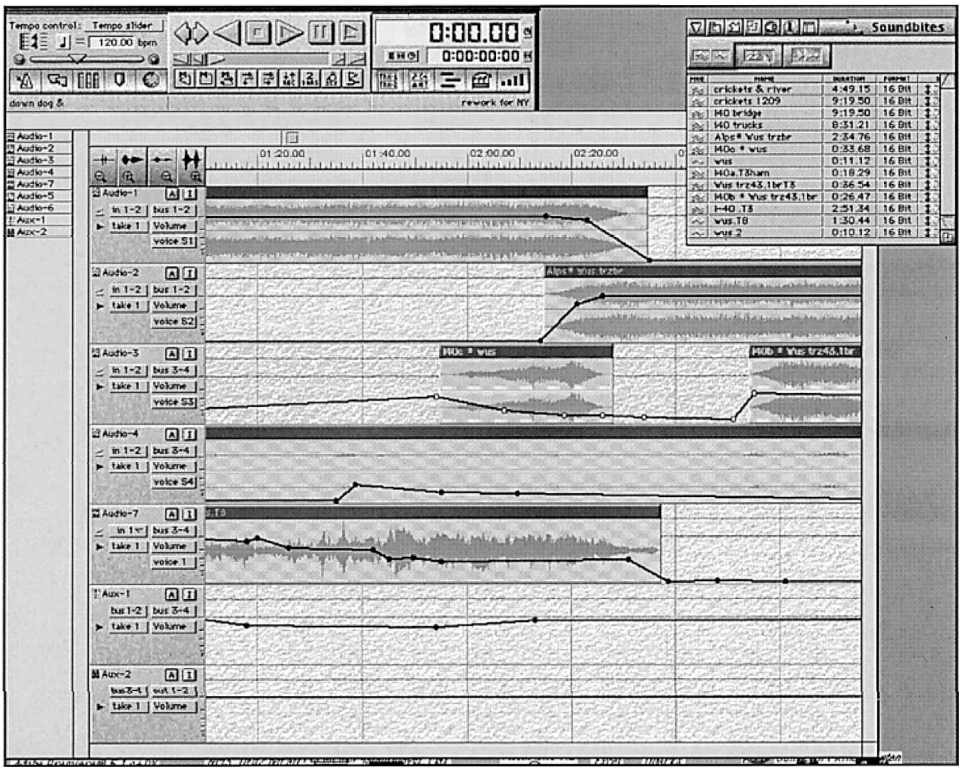

FIG. 4. Digital Performer mixing window.

As the project progressed and students became more adept at using the technology effectively, it was pleasing to note their concerns moving from the issues about 'how to do things ' to those about 'why' (from the technical to the aesthetic). Selwyn (1999), in discussing the role of technologies in learning processes, describes this in terms of visibility or invisibility. Computers as a 'mediating technology' must remain simultaneously visible and invisible in order for effective use to take place:

> … its significance as an effective learning tool must be highly *visible*, while simultaneously its role as a mediating technology supporting visibility of the subject matter must be highly *invisible*. Without a good balance between these two interacting requirements effective use of the computer cannot, and will not, take place. (Selwyn, 1999, p. 45)

One should not underestimate the learning curve that some of this technology requires. Without exception, all of the software used in this project was of a professional standard and not designed specifically for educational use. The project leaders have acted as mediators through which students have accessed and utilised various functions of the software, but on numerous occasions they found students experimenting and 'fiddling' with other features of the software. It is important to recognise this 'accidental' approach to learning with technologies and to facilitate a necessary sense of play and exploration with them. A highly rigorous and structured course design in a particular piece of software may well be appropriate in some situations. However, given the time con-

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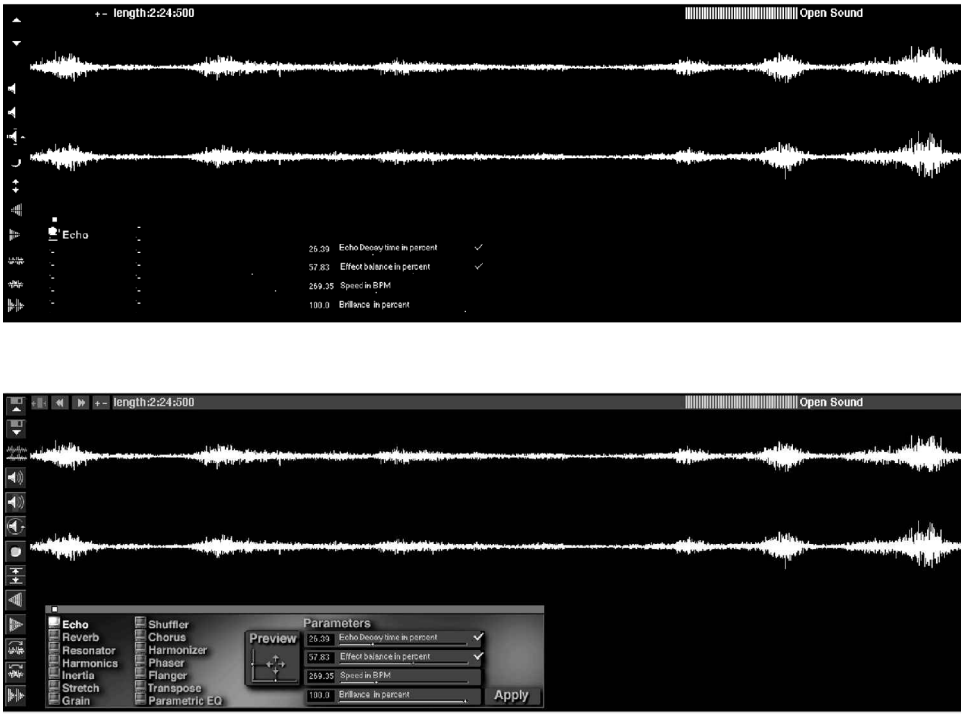

FIG. 5. Metasynth: main window.

straints within the context of this project (and that within which many teachers find themselves working), one has to ask what the best approach might be to enable students to use a piece of software for a creative end. A brief introduction and then timely support, example materials and demonstrations within a wide-ranging and open-ended creative task was, we believe, a successful pedagogical strategy in this project.

> I had another idea with 'golden eye' (a normal eye) and green eye (the same eye but in green). We faded this and spun it around. I only knew how to do this because Dan gave us examples and I took a lot of it in. That was the most effective way of learning in my opinion. (Year 9 girl)

Student Responses to Working with Sounds and Images

All students have been challenged by the results of their compositional labours. Students engaged well with the process of composition with computers, often working in their own time in addition to timetabled lessons. However, the very different sounds that they were working with did stretch their understandings of what they considered to be 'musical'.

One of the challenges for students was to develop an awareness or a 'vocabulary' of electroacoustic sounds and possibilities. The emphasis placed on the selection of 'good' sounds and their subsequent arrangement provided a simple route into this. It was pleasing to note a change in attitude in some students towards the idea that all sounds have potential as music. One student, a competent country-style guitarist, expressed a commonly held view of many students at the end of the project:

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> I think that all sounds can be musical. It depends what you do with them. If you had someone walking, you could just have it as them walking or as a kind of background beat, for example. (Year 10 boy)

Students were also challenged in relation to the use of pre-recorded extracts of music included in the collection of material. Music forms an integral part in the life of many young people and, as part of their documenting of their lives, students valued the inclusion of a representative sample of their music. Strong beats and rhythms dominate much of this music. When working to produce their own music based on these samples, students often seemed attracted and drawn to this strong rhythmic framework. Without this, students expressed a clear sense of disappointment and anticlimax in relation to the music's directionality.

> There was a bit in it like a shuffled beat or something. And it built up and then faded away and it was kind of like you expected a beat to come in there or something. I thought it was disappointing really. It's what we expect really. Because you expect something like a beat to happen and when it doesn't you think "Oh". I think that we are conditioned in a way through our listening? We expect certain things to happen? And if it doesn't we feel that it's not very good and then dissatisfied. (Year 10 boy)

In spite of this, students did realise that what they were creating was something significantly different from their normal experience of music (both within and outside the immediate school context). This Year 10 girl illustrates her definition of creativity in respect to the artistic boundaries that she felt she was pushing throughout the project:

> It's kind of creative, because it's not what you expect to hear. Being creative is being able to do things differently from others. You can push the boundaries a little bit. (Year 10 girl)

Ranges of Expression and Reforming Preconceptions

The material collected by the young offenders fascinated the students. This was evidenced by their rapt attention to the video artist's presentation of the video material (without sound) in the first lesson after Christmas. Students were very keen to ask questions about the daily routine in the life of a young offender, the offences which they had committed (which they were not allowed to know about) and more general questions about the judicial system. The Year 10 group was equally interested in the sonic material. Seemingly insignificant things, like the variety of young offenders' accents, were picked out by students as being of significant interest. The material content of some of the words and phrases used by the prisoners was commented on. Undoubtedly, some of the words and phrases that the prisoners had recorded were there for shock effect. To counterbalance this, students received the recording of a prisoner reading, with obvious difficulty, a poem that he had written with quiet and sombre appreciation.

The young offenders viewed the students as 'little rich kids'. They found their accents interesting too; they commented on how posh, or upper-class, they sounded in comparison to theirs. The Carlford Unit is entirely male and there is no association with female prisoners. There could have been problems with female images within the male environment of the prison, and there were several comments made. The words and thoughts that the prisoners heard in the audio samples tempered these initial reactions. These turn the raw images into characters of students as real individuals. As the project has continued we have noticed a positive change in some of the prisoners reactions to

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these visual materials. However, at no point during the project have students and young offenders been able meet, talk or contact one another. Names of prisoners and students were removed from any sonic material and computer file names.

One initially surprising thing was the similarity of responses between the two groups in certain areas. However, the two groups of project participants are similar ages, have ranges of similar interests and a natural curiosity for the images of the other sex. Examples of sonic and visual themes explored by both groups included:

1. Sports hall games, including basketball, badminton and squash;
2. Sounds of the cafeteria or lunch hall;
3. Weight and fitness rooms;
4. Recorded CD extracts of popular dance music.

But there are stark differences in the environment. The young offenders inhabit an internal space, with hardly any view of the outside world; the students were able to collect a much broader range of environmental material.

Part of the project work included a range of creative writing tasks designed, through a series of questionnaires, to get students to think about themselves, their likes and dislikes, hopes and dreams. Some of the creative writing done by students in the school was very off the wall. Adolescent boys, whether in prison or in school, seem to have a range of weird, sometimes violent, ideas that could be seen to be inappropriate.

Issues of Quality and Assessment

Interestingly, students had very clear views about the value of working at composition in this way. In discussion they were quick to draw comparisons between what might be called this 'technology-driven' approach to composition and more traditional approaches. Consider this exchange in a Year 10 lesson:

Student 1 I think that a lot of people think that making music in this way is just a doss. When people think that you have to play an instrument instead of doing this. I know that my Dad thinks that my DJ-ing is not a skill, its just someone going down to play football or something. But its not, I mean I was trying to teach Clare the other day and it took her forever. I think it's like this in a way. It's not that easy, you've got to spend a fair while getting use to what you're doing.

Student 2 It's too easy. It's not creative enough. You can put any sound you want into a piece pretty much instantly and you don't have to think about.

Student 3 Yeah, but it's quite hard to get a good quality piece.

Teacher What's the difference between a low quality piece of computer music and a high quality piece of computer music?

Student 2 Anything made on a computer is low quality.

Student 1 I don't think so.

Student 4 It doesn't show much talent though if you're using a computer to do it. If you're playing it yourself …

Student 1 Are you saying that Fat Boy Slim is talentless?

Student 2 No, he's pretty amazing.

Student 1 What he does is no difference to Radiohead or Coldplay.

Student 2 It's completely different.

Student1 He's just putting music together. It's just his way of doing it. It's just like learning to play the guitar or the drums.

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Student 5 No it takes a lot longer though—to learn to play the piano for example.
Teacher There seems to be an argument here about how long it would take to learn a traditional instrument rather than the things we have been doing on the computer. Is that what some people are thinking?
Student 6 You haven't got to be talented though.
Teacher What does that mean?
Student 6 You don't know the high skills of being a musician or learning notes.
Student 5 Yeah, talented means you've had to practice hard to get it into your head
Student 1 I agree with them that some of the music made on computers is really rubbish, but some of it is really good. I think it is unfair to say that people who make music on computers are talentless.
Student 2 They have got lots of creativity and they are very talented.
Teacher What do think it means to be creative? What does creativity mean?
Student 5 To do something different.
Student 3 Doing things that are unusual.
Student 5 Outstanding—better than all the rest.

In what was a rather sweeping exchange of views, these students identified a range of issues that are at the heart of a consideration of how to assess and judge the quality of the work resulting from using technology in the classroom. They view the use of these technologies as a way of speeding up the process of making, but recognise that this does not equate to a 'better quality' end product. They suggest that in some ways the speedier process can lead to a lack of thinking about the artistic consequences of a decision.

One boy (student 2) clearly feels that the considerable technical skills that he has obtained through the project do not equate equally with those instrumental skills he has practised and worked on over the previous years. For him, at least, it is just 'too easy'.

Another boy (student 1), an experienced DJ, feels in a very acute way the associated prejudices with this view. He expresses this through his recounting of a conversation with his father about his DJ-ing skills. However, it is only when people try these things out for themselves, as another student had done in the previous week, that they realise the skills and expertise involved.

Towards the end of the discussion, the students appeared to reach a consensus. 'Creativity' and 'talent' become two important features when composing with or without computers. In the students' minds, talent is associated with instrumental skill and ability and of practice (of 'getting it into your head'); creativity, for them, is being and doing 'different', being unusual or outstanding ('better than all the rest'). These are themes that we will return to below.

Impact of Personal Voices

As researchers we often asked ourselves the following question:

> How truthful are we being in calling our project *Reflecting Others*? Are we really encouraging students and young offenders to give considered reflection to the 'other' within their composition work? Or are they doing technological things just for the sake of technological things?

Artistic decisions were being made throughout the project, but were they being made with the right motives and considerations? Does this matter? With the tremendous power that these technologies give, there is an obvious danger of just drifting into arbitrary aesthetic judgements. Issues relating to assessment and evaluation of work comes into

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play here as we try to decipher genuine artistic decision-making. But, as discussed above, one should not rule out the importance of 'artistic accidents'. It certainly seemed that as students and young offenders explored these new technologies there was an increased chance of things happening by accident. Often these so-called 'accidents' resulted in really interesting work that the students liked! This was particularly noticeable when students used the transparency, filter and transition effects within Adobe Premiere, and the Effects Palette within Metasynth.

Laying aside these considerations for a moment, it was pleasing to note in discussion with students that they often felt a real affinity to the young offenders through the material that they had collected. The following comment was fairly typical:

> I like it when they talked about the prison. That person described the place but it looked completely different. The 'Prisoner on the Moon' poem helped us to know what they feel like inside. (Year 10 girl)

Despite not being allowed any personal contact with the young offenders in any way, students still thought deeply about the life of a young offender:

> By the looks of things it looks worse that I thought 'cos I expected they would be able to go outside and do more normal activities like we do. But they're trapped in there never seeing proper sunlight, trapped between walls, bars, gates and doors, trapped in Hollesley Bay for so many years and never going outside. They're looking at the same things day in, day out for years. I think this is wrong. And one boy's poem about the prison backed this up. No crime deserves to do this to a child. (Year 9 boy)

Comments like this impressed on us the value of choosing an appropriate starting point for any creative project. In providing a vehicle for students to challenge social agendas, for example, one is enabling them to grasp a key ingredient of artistic expression—personal communication. So often musical composition within the classroom context is divorced from students' life experiences as teenagers and the real value that music plays for them in expressing their identities, sense of community and environment. But authentic artistic expression is inextricably tied to life itself:

> The more we talk with children and teachers the more music becomes entangled in lives and the more its significance fades in the light of experience. The closer we look at music events in schools the more we see that music is the pretext—life is the text. (Kushner, 1999, p. 216)

As project leaders and teachers, we are only too aware of the pressures that we face in fulfilling the demands of a National Curriculum. But these comments show that students value a chance to use a variety of artistic expressions as a way of commenting and reflecting on their lives and others.

Conclusions

> I am reminded that the transition from acoustic instruments to digital ones, *mutatis mutandis,* has not included a corresponding transition from acoustic to digital music. What has necessarily been a search for a new instrument should now mandate a search for a new music *endemic* to its nature. That is: *computer* music. (Gaburo, 1985, p. 43; emphasis in the original)

Gaburo overstates his case. This typically modernist argument divides musical styles into types, separating them from previous or contemporaneous forms in a claim for unique-

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ness or originality. In our thoroughly postmodern condition this is obviously a misrepresentation. However, when considering the use of ICT in music education one all too often finds a situation similar to that outlined above. For some there is a reluctance to move beyond the familiar world of acoustic instruments and their accumulated sensibilities to a digital age. For others, there is an embracing of the new but in an approach that reinforces and perpetuates past ways of teaching and learning. And all of us, at various times (and rightly so), find ourselves moving between these categories. *Reflecting Others* has been an attempt to adopt a curriculum *endemic* to the nature of digital technologies. But even a project with such an explicit focus as this, as Paul Théberge points out, inevitably falls within a broader continuum of musical expression. For all of us, teachers and students, approach new technologies with 'at least some of our own "accumulated sensibilities" with regards to music making' (Théberge, 1997, p. 159).

Reflecting Others has focussed on using a variety of digital media as a means of collecting, editing and arranging sounds and images. It has been amazing to see how easily students have learnt the skills needed to use these technologies effectively and how they have applied their knowledge in pursuit of a creative purpose.

New technologies can be used effectively and creatively within the music classroom environment. This project has demonstrated that:

1. New Technologies can lead to New Models of Making

Rather than use the technologies to reinforce existing models of performance and composition, these projects demonstrate that students value the opportunity and challenge to express ideas in new ways and through new media. The final installation caused immense interest and excitement in school. Students and staff responded to it in a variety of ways, the majority considering it an effective portrayal of the lives of young teenagers in contrasting environments.

2. Creative Tasks can give a Clear Focus for using New Technologies

In developing links between the creative tasks and the particular pieces of technology, one can ensure that students understand what they are to achieve by using that piece of technology. Appropriate use of different technologies can empower and equip students with the skills needed to fulfil the tasks.

3. Effective Use of these Tools can Democratise Performance and Composition in the Classroom

All students, regardless of instrumental skill or traditional 'musical' ability, can be involved in the music-making process. But new technologies should not be seen as a universal panacea; with them come a range of new skills and abilities that students need to learn and to develop.

4. Changing Models of Performance and Composition require a Changing Model of Assessment and Evaluation

A naturalistic and qualitative evaluation model has proved particularly successful in obtaining a clearer picture of how students use and abuse technologies for creative ends.

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Even with limited resources and large class sizes, the use of new technologies can be a liberating experience for all students. Imaginative approaches to whole class work have meant that all students can share in the experience of artistic practices mediated through new technologies.

Finally, the *Reflecting Others* project demonstrates that a digital arts curriculum can promote and develop students' creativity. Recent research conducted by the National Foundation for Educational Research (NFER) has suggested that 'enjoyment, relevance, skill development, creativity and expressive dimensions' are often absence from students' experiences in music lessons (Harland, Kinder, Lord, Stott, Schagen & Haynes, 2000, p. 568). In light of comments like these it was encouraging to note positive student reactions to their work, particularly their comments relating to the creative process and originality of the end product.

The National Advisory Committee on Creative and Cultural Education 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 four stages being:

> First, they always involve 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).

The *Reflecting Others* project has placed the creative ideas and experiences of young people at the heart of a creative process. The final product of the project, the installation, is not just a reflection of their views of others, but also a reflection 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. As one Year 9 girl put it, 'There are many more ways of expressing yourself rather than just talking'. For some students 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, one which they will not forget and one that may lead them to continue working within these fields in the future.

Burnard suggests that a student's willingness to compose is facilitated by creating an environment within which they can express their creativity. The closer these activities are to students' immediate experiences the greater the potential for creative responses and processes to occur. By choosing starting points that drew on students' own identities, communities and environment and by enabling them to reflect on these individually and

collaboratively through the use of digital technologies, we believe that significant learning took place.

> 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)

Within the final installation we placed tremendous value on representing students' musical work in an authentic way, with minimal interference or adaptation by anyone. In Burnard's words, a 'genuine experience of children *being* composers'.

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Glossary of Technical Terms and Resources Used

The range of hardware and software used in this project was fairly extensive. Each piece was chosen for a particular purpose.

Hardware

1. iMac computers (400 MHz processor, 192 MB RAM) generally proved to be a reliable and effective tool in dealing with the large amounts of digital material that the project generated. Students adapted well to the slightly different conventions within the operating system and quickly overcame any technical hitches.
2. Two external firewire hard disks were used to collect all the video and audio material. They each collected over 25 gigabytes of sonic and visual material. The fast rate that material could be transferred between the computers and the hard disks was particularly beneficial.
3. A Panasonic digital video camera (Panasonic DX110) was used in the initial stages of the project. This worked brilliantly from the outset. The camera was connected to the computer through the firewire port and this worked faultlessly.
4. Two Sony MiniDisc players (MZ-R35 and MZ-R70) were used throughout the project. Their portability was key to the project's success. They facilitated the capturing of high quality sounds from many different environments.

Software

1. Digital Performer (http://www.musictrack.co.uk) has been used exclusively for its powerful audio handling capabilities. We made no use of its MIDI capabilities. It has proved to be a highly effective tool to edit and mix sounds.
2. Metasynth (http://www.uisoftware.com/) proved to be highly effective as a means of transforming audio samples into new sounds. The Effects Palette function of this software enabled them to manipulate the various parameters of a given effect (e.g. reverberation, inertia or grain) through moving the mouse around the screen. It was a simple and intuitive function that produced amazing results.
3. Adobe Premiere (http://www.adobe.com/motion/products.html) has been used as a video editing software throughout the project. Whilst in the initial stages of the project students found this software quite complex, with continued practice consider-

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able progress was made. The digital effects, filters and transitions contained with the program were extensive and well used. A common problem was the amount of time it took to render pieces of video.

4. Instant Player (http://www.soundhack.com/) is a piece of freeware that allowed students to play audio files by option-clicking the file name. This facilitated the selection process immensely.

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