New Models for Creative Practice with Music Technologies

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Introduction

The thorny issue of assessing pupils' creative work is never far away from any current debate. Whether it is in teaching or research communities there always seems to be considerable unease about the how and why of musical assessment. Formative or summative, process or product, quantitative or qualitative, teacher or pupil based, the apparent opposites represent a picture of uncertainty.

To add to this confusion of principles and practices, the recent explosion of new technologies within educational practice has brought with it its own problematic view of assessment. Should compositions that are produced solely on a computer or by using other technologies be assessed in a similar way to those compositions using traditional instruments? Are there generic compositional skills that cross all means of compositional production? Or does the piece of technology being used implicate the compositional process in such an explicit way that it demands its own type or method of assessment? And in a world where any sound can be captured and used as compositional material, where does that leave our assessment criteria that often give emphasis to melody, harmony, and rhythm? How can we tell if a pupil has been truly 'creative' with a piece of technology? What might a creative technological skill look like?

Whilst a short chapter like this cannot hope to answer all of these questions, what follows will open up the world of music technologies for those who are in the position of having to make judgements of pupils' work. The following arguments are not meant to refute or replace current assessment procedures. They should rather be seen as being complementary to the range of assessment devices and procedures that an effective music teacher currently employs. But what follows will, of course, seek to analyse the specific influences that pieces of music technology play in the production and assessment of pupils' compositions.

The creative power of technologies

Given the often highly charged nature of the debate about musical assessment

where should one turn for ideas and advice about assessing technology-based composition work? A key area for investigation ought to be artistic practice that wholeheartedly embraces a vision of musical composition inspired by technology. Electroacoustic composers are one such diverse body, with many contrasting and competing forms of practice. But here, perhaps more than anywhere, composers, researchers and those searching for new pedagogies are grappling with ideas about evaluating and assessing musical works influenced by technology.

Quoting Pierre Schaeffer, an influential figure in the development of models of electroacoustic studio practice, John Dack (1999) provides a foundation for the idea of technologies being a formative influence in compositional activity:

> The creative power of the machine. … Machines suddenly are not content to retransmit what was given to them; they have begun – as if of their own accord – to make something. (Schaeffer 1977, p.168)

> These machines for feeling allow humans to see, to hear, to touch what his eyes could never have shown him, his ears could never have made him hear, to touch what his hands could never have let him touch. (Schaeffer 1970, p.92)

Popular musicians are another such diverse body. When examining styles of popular musical composition and performance the influence of technology is only too apparent. As an example, consider the relatively simple notion of expanding arrays of sounds available to pupils through a modern keyboard or computer sound card. Paul Théberge, in one of the most comprehensive reviews of the impact of technologies on musical practice, quotes a number of famous artists who comment on how the nature and selection of a sound itself has inspired their compositional process:

> I've been getting into sounds lately ... realising that if something has an interesting enough sound, you don't have to play as much on the instrument. If you get a keyboard that has an interesting sound, you don't have to play a lot of notes on it. The *sound* takes over ... They're part of the composition, even though I think a lot of people might see it as being kind of superfluous to the essence of the music. But in this music I think it's really important. (Marcus Miller in Théberge 1997, p.186)

> Sounds really make you play in a different way. If you have a little, dry, ticky-type sound, you might not take the soaring solo that you would with a different sound ... I really think that sounds inspire you. (Starr Parodi, ibid. p.198)

So in both electroacoustic and popular music one can find composers and performers deliberating on the influences of technology on their musical practice. Perhaps this is not so surprising. After all, are not all technologies only tools in the hands of competent or incompetent users? Skilful or non-skilful uses of technologies are to be expected. Take a moment to reflect on how this current discussion might have been conducted by previous generations. What might Mozart have had to say about the new 'technology' of the clarinet? Or how did Beethoven's compositional practice change in relation to the new 'technologically enhanced' pianoforte of his day? Wherever or whenever one looks, the relationship between composer, instrument (as a type of technology) and compositional ideas are complex and intricate.

A Conceptual Triangle

> An appreciation of the relationship between the musical work and its context of realisation must precede concerns regarding the materials of composing and techniques of composition, as the nature of the studio as work-space clearly sets certain limitations on the types of activity that may take place within its environment. (Vaughan 1994, p.111)

In seeking to develop ideas for the assessment of pupils' work with music technologies, it has proved helpful to consider the work of two authors. Paul Théberge has been mentioned already and Michael Vaughan's article, 'The Human-Machine Interface in Electroacoustic Music Composition', provides a fascinating insight into the relationship between electroacoustic composers and the technologies used to realise their compositional ideas. The model that Vaughan puts forward is a triangular one between the composer, the composition and the equipment. But Vaughan quickly acknowledges that there are fundamental tensions within this model:

> From the composer's point of view the central problem lies in the manner in which the composer is able (or unable) to interact with the materials and processes associated with the musical work. The method of interaction should facilitate the refinement and development of procedures directed at the optimal use of legitimate idioms rather than imposing a need to conquer the mental hurdles generated by the expediency of hardware and software design. (ibid. p.113)

Substitute the word *pupil* for *composer* in the above and one begins to get an idea of the complexity of the problem. To paraphrase Vaughan, pupils should be able

to interact with the musical ideas and processes of their composition work without having to conquer mental (or practical) hurdles imposed by pieces of technology. Yet within the classroom this problem is exacerbated further. Most of us use technologies in our teaching that are ill defined in relation to their pedagogical function. Many of these technologies are designed for the professional studio rather than the classroom. This can result in yet another 'hurdle' to be overcome by teachers and pupils if progress is to be made. There is no doubt that the way in which teachers select and present certain pieces of technology to their pupils is very important, equally important as how one assesses their work, but this is the topic of another chapter! For some creative examples of how one teacher has attempted to overcome this problem see Savage & Challis 2001a & b.

But in order to assess the compositional work that results, one needs to have a thorough knowledge of each part of this conceptual triangle: the pupil, the technology and the pupils' compositional ideas. At this point a small presumption will be made. Within the context of classroom composition work and the assessment of composition work for GCSE, teachers know their pupils well and, through the defining and refining of compositional tasks, have an awareness of their compositional ideas, at least in part.

Leaving these sides of the conceptual triangle aside for the moment, the next section of this chapter will outline issues particularly related to the final part of the conceptual triangle, that of the 'context of realisation'. The assessment debate will also be left to one side as these issues are explored. The penultimate section will seek to link the three sections of the conceptual triangle together and give some practical suggestions as to how to assess pupils' work with technologies. So, what kinds of influence to pieces of technology exert over pupils' compositional ideas and practices?

The Influence of Technologies on Musical Composition

This section will outline some of these influences drawn from observations of composition work by electroacoustic and popular musicians (although the two are not exclusive!). Alongside these observations are a series of questions written for teachers to think about in relation to their own teaching practice with music technologies. These questions are differentiated in the text by means of being **highlighted in a bold style**.

Musical Control: The limiting features of technologies?

> A studio, whether it be a large purpose-built installation or a more
> modest domestic environment, exercises certain constraints on the
> composer as well as facilitating the activity of composing. These
> constraints may be viewed as the exercising of a form of social control on
> the massed ideas of compositional strategies. (ibid. p.120)

All musical technologies, and one can include musical instruments in this
category, exercise a form of control over the composer. This can be positive and
enabling or negative and limiting. In practice it means that the rigidity of the
technology's functions can limit forms of expression. A simple example would be
the use of a computer-based sequencing environment such as Cubase VST. This
software represents aspects of time and space rigidly through a compositional
'time line'. Compared to a tape recorder, it is very easy to move through the
'blocks' of a composition within this environment and adopt metaphors such as
'cut, copy and paste' to extend and develop musical material. Looping of sections
and simple textural contrasts of addition or subtracting material are simple to
achieve. Folkestad, Hargreaves and Lindström (1998) identified that sequencers
clearly initiate or predicate a particular model of compositional practice
('vertical' composition) on pupils. To work in a contrasting way ('horizontally')
required a considerable amount of devious effort on the part of the pupil. This
devious effort may well be worth encouraging, being analogous to the
'resistance' that traditional materials exhibit towards the artist, e.g. stone to the
sculptor, paint to the painter, reed/mouthpiece and the complexity of the
fingering to the clarinettist.

Another controlling feature would be the way in which sounds, symbols or other
data are represented within a piece of software to the pupil. MIDI is one such
meta-system. It can prioritise certain forms of musical expression and control
over others. MIDI data is primarily concerned with elements of pitch, time and
volume. It is not surprising to find, therefore, that the majority of sequencers
used in UK classrooms are linked to piano-type keyboards and that a pitch-based
approach to compositional activity is prevalent. This suits a basic approach to
MIDI that divorces the sound materials themselves from the symbols used to
manipulate them:

> The MIDI sequencer reproduces the divisions defined in traditional
> musical notation and extends them further. The 'language' of music is
> kept separate from its manifestation in sound, as are its performance
> gestures. The tendency towards a rational, calculated approach to the

nuances of performance as represented in the MIDI data stream is, in part, a result of the quantitative nature of the data itself. In this way, MIDI can be understood as an extension of the shifting complexities of traditional musical notation and the general, historical trend toward greater notational specificity. … The various elements of gesture and performance thus undergo a fragmentation far greater than that associated with conventional notation. (Théberge 1997, p.225)

The closed nature of the typical MIDI configuration, and its ignorance of the sounds actually produced, can result in a serious dislocation between the *symbols* with which the composer interacts and the material itself. … The more distant the aesthetic concerns from simple forms of tonal instrumental music, the greater the distance between the sonic reality and its symbolic representation. (Vaughan 1994, pp.123-124)

Recent developments in MIDI technologies have begun to counteract these problems. Although they are seldom seen in high school classrooms, softwares like Max/MSP and some other real-time environments running on very fast processors substantially remove many of the problems that MIDI's initial conception imposed on the musical imagination. They allow the moulding of sound 'as material' rather than through analogies of notation. This is an avenue worthy of further exploration by interested teachers and researchers.

What are the significant characteristics of the technologies used in our classrooms?
What types of control to they exercise over pupils as they seek to initiate and develop their compositional ideas?
How do the symbols that the pieces of technology use to represent sound materials effect the pupils' compositional practice?

Musical Interference: Technologies getting in the way?

The quality of the interface between artistic intention and the materials of composition is, therefore, a major contributory factor to the outcome of an electroacoustic work. (ibid. p.126)

Music technologies are tools of expression. In this way they are similar to conventional instruments. Certain features of the interactions between pupils and technologies or instruments are similar. But when it comes to using music technologies as tools for composition there are some important features that ought to be present. Adorno identified the crux of the argument nearly fifty years ago:

There is a requirement for an approach to the design of hardware and software for musical applications to which the key is flexibility of interaction. The composer should be empowered to realise the fruits of his or her artistic imagination without the 'interposition of the equipment' being 'stamped on every tone'. (Adorno 1954, p.110)

Unfortunately, too often pupil's compositions do demonstrate the equipment's 'stamp on every tone' and this may not be the pupil's fault! Inappropriate designs and uses of technologies can often get in the way of unfettered artistic expression. Yet many technologies available today offer the chance for flexibility in numerous ways, e.g. in generating, manipulating or ordering sounds. Vaughan (pp.126-127) suggests a number of positive features that ought to characterise the interface the technology has between our pupils and their compositional ideas. He suggests that the technology should enable our pupils to:

feel close to the compositional materials;
identify and experience a correlation between the physical impulse of generation and the aural result;
customise individual approaches to its use;
adopt rigid or flexible (improvisatory) approaches to composition
see and hear the correspondence between symbol morphologies and the sounds themselves;
adopt appropriate methods for representing higher-level musical structures.

What are the limitations in the types of technological interfaces that we use in our classrooms?
What kinds of technological interfaces have worked well with your pupils?
What about the larger scale formal design of a composition? Is this facilitated or inhibited by the technologies that pupils use?
What strategies can we use to encourage pupils to think beyond the screen and its associated symbols?

Musical Environments: Facilitating or limiting?

Once you become familiar with studio facilities you can begin to compose in relation to those facilities. You can begin to think in terms of putting something on, putting something else on, trying this on top of it, and so on, then taking some of the original things off, or taking a mixture of

things off, and seeing what you're left with – actually constructing a piece in the studio. (Brian Eno in Théberge 1997, p.216)

Eno emphasises the importance of the *context* of any compositional activity. This reinforces the second of Spruce's fundamental tenets of musical assessment, namely that 'assessment can be understood only in the context of curriculum and pedagogy' (Philpott & Plummeridge 2001, p.118), to which one might add 'compositional resources'. But, of course, there are those that disagree:

> I just don't want to be too distracted by colour. When I decided to write the songs on *Strange Angels* I thought, "Well, if I just sit down at a piano and play them and sing them, then they'll work." I decided to take that approach rather than immediately getting distracted - "Oh, I have this great Akai sample that I just have to use, and even though it doesn't have too much to do with what I think the tempo of the song is, we'll, uh, work around that." *Working with piano sounds makes me pay closer attention to the real structure of the song. It strips the song down to the most plain kind of version.* (Laurie Anderson, ibid. pp.198-99 *my italics*)

These ideas have corresponding practices within our classrooms. One can imagine a situation where pupils' access to certain pieces of technology is limited to those who have already worked their compositional ideas out using more traditional methods. Rather than compose through the technology, as Eno's model suggests, these pupils compose independently of the technology and use it as an arranging or presentational tool. It is not the purpose of this chapter to champion one method over another. But we need to be aware that both approaches have proved effective for established composers and can work for our pupils too.

Similarly, there is often a presumption in our classrooms that the latest, all-singing-all-dancing software environment is going to automatically be the most facilitating for our pupils' composition work. John Dack, in an article for the *Journal of Electroacoustic Music*, begs to differ. His research has looked at the different ways in which students use analogue and digital music technologies as compositional tools. With his students he has found that:

> … a premature introduction to performance with digital systems can result in unintentionally disregarding crucial aspects of technology-based interaction. (Dack 1999, p.30)

He found a number of benefits in introducing students to an analogue environment for electroacoustic composition prior to the 'often abstract and remote' environments that digital softwares (such as computer-based sequencers,

audio editors and processors) present to the user. Benefits of using this older type of compositional environment included:

Signal paths being more easily demonstrated;
Knobs, buttons and faders facilitating an intuitive and responsive control of a sound's parameters;
An immediacy of control and aural verification.

> The effects of these gestures on different sounds enables the musician rapidly to collate and assess many types of transformation … Such experimentation thus provides an invaluable preliminary stage before the often abstract, remote nature of software and virtual environments. (ibid. p.30)

There is no doubt that the studio environment is an important influence on the outcome of a musical work. Different types of environment will effect the composition process in different ways. Older technological environments may well facilitate approaches to composition that newer environments limit. There have been many examples of recent digital technologies that are modelled on older, more established analogue processes and interfaces. In the recent curriculum project *Dunwich Revisited* (Savage & Challis 2001a), the traditional dials on the front of the signal processors facilitated a direct sense of play with a sound's parameters that a numeric, digital, or software interface may have inhibited. But many digital environments can promote simple and accessible, yet very powerful, control of recorded sounds. The movement of a mouse around the screen to change a sound's parameters (in the Effects Palette of *Metasynth*) was a fantastic tool for all pupils in the *Reflecting Others* curriculum project (Savage & Challis 2001b).

> **Brian Eno and Laurie Anderson (quoted at the opening of this section) clearly represent two different approaches to composition with technology. Do you recognise either of these approaches in your own or your pupils' work?**
> **How can pupils be encouraged to cross the divide between these camps? Should they be encouraged too?**
> **What older pieces of technology do you have in your department? How might they be best utilised? Can they be used to teach pupils important lessons that more modern technologies might not be able too?**

Assessing Pupils' Work with Technologies

The previous section has spent a considerable amount of time considering the third section of the conceptual triangle, that of the 'context of realisation'. It is this part of the triangle that is least represented or understood by current assessment practices. In doing this it is hoped that the above remarks will provide a framework for some practical assessment ideas, as well as providing some starting points for future research and teaching practice. The writer is very interested in establishing contact with other teachers who share similar interests and who may want to undertake further collaborative work in this area.

Many of the considerations that teachers make about their pupils' work will be very similar whether or not a piece of technology has been involved in the works' production or performance. It is important not to throw the baby out with the bath water or reinvent the assessment wheel! However, there are some distinct issues that the uses of music technologies bring when developing a model of assessment (and these are outlined below).

Music technologies are not a passive force in composition. As has been identified above, they have a 'creative power' of their own. They effect the compositional process in a fundamental way. This effect needs to be documented and understood by teachers and pupils.
The increasing availability of sounds is one important feature of many new music technologies. Pupils will respond to these sounds in different ways. The sound itself may well inspire new creative ideas. The sound can take over. They become the essence of the music. Look out for examples of this in pupils' work and be prepared to discuss them with the pupils.
With any musical assessment keep the triangular model in mind: the pupil, the compositional framework of ideas (established by the teacher or the pupil) and the technologies employed. Each is equally important.
In an assessment of the composition, take into account the ways in which music technologies control the pupils' compositional activity. In particular, think about the influence of the technology's interface and environment. These are fundamentally important to how pupils use a piece of music technology.
Work with pieces of technology yourself before letting your pupils loose with them. As you work, keep some of the questions raised in this chapter at the back of your mind. What influence is this piece of technology having on me, as an experienced musician (performer or composer)?
Has the pupil conformed to the technology's power or sought to overcome it and abuse it in particular ways? Either of these approaches may result in imaginative or uninspired work. Raise these with pupils as important questions for them to

consider.

How flexible has the pupil been in response to these issues? Are they really using the technology as a tool for their artistic expression? Can they give a good explanation to the 'How' and 'Why' questions that you may ask them about the choices they have made in their composition?

Be imaginative in the types of technologies that are used in composition work. Older technologies may facilitate greater musical expression and newer technologies are very powerful, but both may need to tailored to the classroom context. Make pupils aware of these issues and give them credit in your assessment when they begin to move beyond the initial boundaries that you have established and explore more sophisticated areas of the technology. Assess pupils' work in response to these technological concerns **and** Spruce's model of 'curriculum and pedagogy'.

Be aware that for some pupils more traditional models of composition are preferable. Their use of a particular piece of technology may come later on as an arranging or presentational tool. Whilst the thrust of this chapter has been to suggest that music technologies are powerful and creative compositional tools for a whole range of musical styles, there are many composers who work very effectively in more traditional ways. Pupils who work in this way can be challenged, gently, about their compositional practice but may find their tried and tested approach more preferable despite your best efforts!

As with any good assessment practice, seek to involve the pupil at every stage. Their thoughts and observations on their work hold the key to your understanding of how the particular music technologies have influenced their work. Build in models of self-assessment (through diaries, set evaluation questions, peer or class discussions, etc) at ever stage of their work. Make this a natural part of the pupils' compositional process. It will help them to produce better compositions as well as help you assess them fairly.

As will be discussed below, give priority to formative approaches to assessment. They will give you the clearest picture of an individual pupil's musical composition.

Conclusion

In concluding, it is worthwhile restating the two fundamental beliefs on which Spruce builds his fascinating chapter on musical assessment. Firstly, that musical assessment has 'behind it a view of learning, of the place of the child in the larger world and of what counts as worthwhile learning'; secondly, that 'assessment can be understood only in the context of curriculum and pedagogy' (Philpott &

Plummeridge 2001, p.118).

Of course, any writing on musical assessment in the current climate could not be complete without a passing reference to the National Curriculum's Attainment Target for Music and the associated level descriptors (DfES/QCA 1999). As they stand, they make no explicit reference to music technologies. This is both sensible and helpful. Music technologies are only one tool amongst many that pupils will use in their Key Stage 3 music education.

Rather, the level descriptors comprise of a series of generic statements about pupils progressive engagement with sound, moving from 'recognising and exploring how sounds can be made and changed (level 1); to 'identifying and exploring musical devices' (level 5); and 'discriminating and exploiting the characteristics and expressive potential of selected musical resources' (level 8). Music technologies could be seen to problematise this model if one forgets that they are meant to present a culminative process, with each level including rather than replacing previous knowledge and experience. If this important feature is neglected, then one can only wonder why many successful composers spend so much of their time recognising and exploring how sounds can be made and changed, something that music technologies greatly facilitate but which is only considered a level 1 activity!

Perhaps a greater source of comfort for those seeking to implement an effective assessment strategy for their pupils' composition work with technology can be found in the rapidly increasing literature on creativity. Many recent publications could be cited, but perhaps one of the most influential in recent years has been the NACCCE report *All Our Futures*. What should one aim for when teaching for creativity?

> Autonomy on both sides: a feeling of ownership and control over the ideas that are being offered;
> Authenticity in initiatives and responses, deciding for oneself on the basis of one's own judgement;
> Openness to new and unusual ideas, and to a variety of methods and approaches;
> Respect for each other and for the ideas that emerge;
> Fulfillment: from each a feeling of anticipation, satisfaction, involvement and enjoyment of the creative relationship.
> (NACCCE, p.106)

Many of these features should characterise effective work with new technologies that should, after all, encourage and empower pupils with an essential tool

through which to express creative ideas. But specifically in terms of assessment, the NACCCE report comments that the educational importance of formative assessment is often underplayed by teachers in favour of the collection of summative assessment data. Yet it is in and through these very formative processes that teachers can begin to obtain a fuller picture of their pupils' composition work with music technologies. NACCCE suggest that effective formative assessment has four important principles:

> It must be built into the design of the teaching programme as an integral element rather than added on to it;
> Pupils should be actively involved in the processes of assessment and contribute to them;
> It must be focused on the development of each individual: i.e., it must be criterion referenced rather than norm referenced;
> The evidence it provides must be acted on if teaching is to be tuned to the range of pupils' individual developments.
>
> (NACCCE, p.131)

These ideas represent as good a starting point as any and have been important themes throughout this chapter. Whether one is teaching for creativity, or developing composition skills through the appropriate use of music technologies, or both, the pupils' individual development should be of primary importance. Music technologies can and should work as tools for creativity in the music classroom. It is hoped that some of the above may help teachers obtain a fuller and clear picture of how this process actually occurs, for the benefit of all our pupils.

Bibliography

ADORNO, T. W. (1954) 'The Ageing of the New Music' *Telos* 77, Fall 1988, pp. 95-116.

DACK, J. (1997) 'Pedagogy and the Studio' in Sonic Arts Network *Journal of Electroacoustic Music* 10, pp.10-11.

DACK, J. (1999) 'The Creative Power of the Machine' *Journal of Electroacoustic Music* 12, Sonic Arts Network, pp.30-31.

DfES/QCA (1999) *The National Curriculum for Music* London, DfES/QCA.

FOLKESTAD, G., HARGREAVES, D. & LINDSTRÖM, B. (1998) Compositional strategies in computer-based music-making, *British Journal of Music Education*,

15:1, pp. 83-97.

NACCCE *All Our Futures* London, DCMS/DfEE.

SAVAGE, J. and CHALLIS, M. (2001a) 'Dunwich Revisited: Collaborative composition and performance with new technologies' *British Journal of Music Education* 18:2, 139-149.

SAVAGE, J. and CHALLIS, M. (2001b) 'A Digital Arts Curriculum? Practical ways forward' (to be published shortly in *Music Education Research*).

SCHAEFFER, P. (1977) 'De la Musique Concrète a la Musique Même' *La Revue Musicale* Paris, Richard-Masse.

SCHAEFFER, P. (1970) *Machines à Communiquer* Paris, Editions du Seuil.

SPRUCE, G. 'Music assessment and the hegemony of musical heritage' in PHILPOTT, C. & PLUMMERIDGE, C. (2001) *Issues in Music Teaching* London, Routledge.

THÉBERGE, P. (1997) *Any Sound You Can Imagine: Making music/consuming technology* Hanover & London, Wesleyan University Press.

VAUGHAN, M. (1994) 'The Human-Machine Interface in Electroacoustic Music Composition' *Contemporary Music Review* 10:2, pp.111-127.

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