Exploring a Socially Just Approach to Music Education with Technology

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Abstract

This chapter explores issues of social justice in music education with technology in a two key settings. The first of these relates to the provision of examinations in music and music technology within the United Kingdom. The second recounts a project conducted in Manchester, north-west England, that drew together two groups of students from very different musical and social backgrounds. These settings illustrate and highlight a number of issues relating to themes of social justice, technology and music education. An alternative, more socially just, vision of music education with technology is envisaged, with key characteristics drawn from the work of other theorists, practitioners and the research literature.

Keywords

Music technology, social justice, public examination, gender, equality, accessibility, instruments, composition, performance

Introduction

What does social justice mean for music education with technology? At the most general level, social justice implies fairness for all, a responsibility towards one another, and a commitment to ensure that everyone has an equal chance to succeed. However, the balance between social equality and individual freedom is a complex one. It is helpful to see these as being in tension and to consider how they can be balanced against one another within the context of music education and the specific context of music education with technology. Here, perhaps, issues associated with social justice are particularly acute. At the most obvious level, music technologies, like many musical instruments, are often expensive and difficult to access. Like the provision of music education opportunities generally, access to music technology as a resource is dependent on decisions made by teachers, head-teachers or other leaders who may or may not prioritise music technology in their budgets. But at a deeper level, the systems through which music education take place, and the policies that underpin these systems, can also be seen to be influencing the extent to which music technology within music education could be portrayed as socially just or unjust.

Technology is not a neutral force but nor is it an unwielding master. It exists within particular educational contexts and shapes the various actions that occur within them. One of the most important keys for any music educator is to find the tools by which to analyse these interactions and consider how to shape them for the educational benefit of all involved. This is far from simple. As Mansfield (2005, p.150) put it, all music educators are ethically obligated to foster, 'a critical awareness of a technologically mediated music education environment'. The word 'critical' is vitally important in this sentence.

This chapter will explore the issues of social justice in music education with technology in a variety of contexts. The first of these relates to the provision of examinations in music and music technology within the United Kingdom. The second recounts a project conducted in Manchester, north-west England, that drew together two groups of students from very different musical social backgrounds within a technologically rich, music education environment. I will use these two contrasting contexts to highlight a number of issues relating to our chapter's key themes of social justice, technology and music education. Along the way, I will draw on a number of other observations from educational policy within the context of the United Kingdom and from observations of schools and music education hubs. Following this, I will draw together a range of discussion points relating to how we can build a more socially just model of music education with technology.

Case Study 1: 'Those who can do Music, those who can't do Music Technology'

Robert Benchley, the famous American columnist, once quipped that 'there are two kinds of people in the world: those who divide the world into two kinds of people, and those who don't'. I was reminded of the quote when interviewing a number of teachers for a piece of research for Roland, a leading manufacturer of music technology (Savage 2010). During one interview, I was taken aback by the bluntness of the teacher's view in relation to the examination courses being offered at Key Stage 4 (for students aged between 14 and 16 years of age). When asked whether a student would be encouraged to take the General Certificate of Secondary Education (GCSE) in Music or an alternative (vocational) qualification (a BTec) in music technology, the teacher replied like this: 'Those who can do Music, those who can't do Music Technology'.

This teacher's sharp division in terms of their students' suitableness for studying music, or music technology, troubled me. It made me wonder whether such views were commonplace or whether they had been fostered

within a particular educational climate within the United Kingdom. Over the past few months it led me to do a little historical analysis of our examination frameworks within the United Kingdom.

For the last sixteen years, students have been able to study for a separate Advanced Level (A Level) qualification in music with technology, an examination usually taken at the age of 18; more recently, during the early 2000s, vocational qualifications in Music with a significant, if not entire, course content devoted to music technology (e.g. recording, production and other technologically-mediated musical activities) have been available to students from the age of 14 onwards. Alongside these specialist courses, references to music technology and its use have continued to appear in National Curriculum Programmes of Study in various forms.

What is quickly apparent from a cursory overview of the curriculum and qualification frameworks within the United Kingdom is that students' experience of music technology begins as part of broader music curriculum experience within the school but quickly becomes specialised around the age of fourteen into discrete qualifications that focus, to a greater or lesser extent, on the specialist skills associated with music technology.

An analysis of the number of students taking these examinations is informative. Research (Cambridge Associates 2013a, 2012a, 2011a) demonstrates that the number of students studying for both an A level in Music and an A level in Music Technology have fallen by around 35% over the last three years. Whilst the gender balance in relation to A Level Music slightly favours boys (16% more boys than girls studied for this examination in 2012), the differences in terms of gender within the A Level Music Technology intake are significant. Between 2010 and 2012, for example, 85% of entrants for this examination were male.

In respect of the 'vocational' curriculum offered through qualifications such as the BTec First and BTec National examinations, a similarly marked difference in gender is noted (Edexcel 2012 & 2013). Across the entire portfolio of examinations (i.e. in every subject) offered by Edexcel (the awarding body), male students favour female students by 52% to 48%. However, within the Music courses that, as stated, have a core element of music technology within them, the gender imbalance is significant. Over the last three years, within the Level 2 BTec First male students account for around 63% of the total student entries; at Level 3 (BTec National) they account for 80% of the total student entries.

Against this backdrop, the GCSE Music examination has been taken by around 11% fewer students in 2012 compared to 2010 (Cambridge Associates 2013b, 2012b & 2011b). The gender imbalance has narrowed from around a 10% gap (with boys outnumbering girls) in 2010 to a 3% difference in favour of the boys in 2013.

I have dwelt on these figures for a number of reasons. Firstly, and obviously, the separation of the study of music technology from the study of music in the United Kingdom's curriculum and examination framework has created a significant gender imbalance. This is something that numerous writers have observed for many years in respect of technology generally, and computing specifically. Clegg, writing in 2001, commented that:

The dominant discourse in computing is shaped by social practices which have institutionalized the power of experts, mostly male, to define what counts as computing in education … these ideologies in turn shape the climate which women have to negotiate' (Clegg 2001, p.308)

There a few things in education more 'institutionalized' than the examination system! The concepts and hierarchies imposed within this system shape, in very powerful ways, notions of gendered subjects – both male and female. as Francis points out, this benefits neither boys or girls,:

Gender difference is socially produced and often limiting to both sexes. Moreover, this social construction of gender difference holds important consequences in terms of power, because in the dichotomous construction of gender, power is located in the male, and the female is subjugated. … The main point about discourses is that they carry power in their ability to position things and people as negative or positive, powerless or powerful. (Francis 2000, p.19)

Whilst the number of boys studying a formal qualification in music or music technology always outnumbers the number of girls studying for the same qualification, the more music technology content that is included within the examination itself results in the gap between male and female students widening (at its largest to a massive 80% difference with the Level 3 BTec qualifications).

Gender issues associated with music technology within the school have been explored in Armstrong's recent book (Armstrong 2011). Through a

number of chapters she explores the processes and practices that contribute to the gendered culture of a classroom when music technology is used within compositional tasks. She analyses specific elements such as how institutional factors shape (and are shaped by) gender-technology relations, the nature of technological talk and how this impacts on the ways in which boys and girls learn differently about technology, and the default masculine role in controlling technology and technological information. One of her key points relates to how a teacher's pedagogy is gendered and the negative effects this can have on students' sense of ownership of their work. Throughout her book, Armstrong argues that historical and cultural forces have confined women to a particular compositional space; this, she argues, needs to be reclaimed and thereby facilitate a greater degree of agency for young female composers. What is true in relation to Armstrong's arguments in terms of musical composition within the classroom, is also the case for the wider application of music technology throughout our educational system as evidenced by the statistics presented above.

In addition to gender segregation, whilst the decline in students taking GCSE and A Level examinations in Music has been marked during the same period of time the total number of students taking vocational qualifications such as the BTec courses referred to here has increased by around 22% since 2012 to 2013. What are perceived as academic qualifications on one hand have diminished, whilst those relating more closely to technological skills, popular musical styles and perceived employability have prospered. I make no value judgements here, but the change in fortunes is stark.

Within the United Kingdom, the move in the 1990s to distinguish music without technology (in a general sense) from music with technology has resulted in such a highly unhelpful, gendered and rigid delineation of musical content, activity, perceived relevance in terms of 'employability' and technologically-mediated practice to such an extent that it is difficult to see any way in which this could be reversed. The impact of these changes within the examination framework encompassing schools have been felt higher up the educational system within the United Kingdom too, with the number of male applicants to universities increasing rapidly in recent years (Armstrong 2011, p.3). As music education has focused increasingly on technology, 'what we are witnessing is a shift from a traditionally 'feminine' subject to a subject that has increasingly masculine connotations' (ibid).

Case Study 2: DubDubDub, the sounds of the world-wide-web

Within this context of sharp categorisations of what counts as 'proper' music, with or without technology, certain projects have tried to explore a more unified approach to music education. DubDubDub was one such project conducted by staff and students from Egerton High School and Manchester Metropolitan University. The project was supported by a not-for-profit software development company, UCan.tv. The name DubDubDub references the three 'w's of Internet URLs. It introduced a new type of digital musical instrument to the classroom, the DubDubDub player, which developed students' musical performance skills by drawing on the sonic environment of the Internet. Within this context, users of DubDubDub remixed the sonic content of the Internet, arranged sounds and prioritised them in real time to form new musical works. The initial aim of the project was to develop an intuitive software instrument that would facilitate effective control of live Internet audio and then to use this tool in a performance setting. The first DubDubDub performance took place with a string quartet from the Royal Northern College of Music and a group of MCs and DJs drawn from an extended schools project held at Egerton High School at the Discourse, Power and Resistance conference (hosted by the University of Plymouth and Manchester Metropolitan University) on the 21st April 2006 (MMU 2006).

The performance moved through three sections. A string quartet opened with a traditional performance of Pachelbel's *Canon*. During the second stage of the performance, this was deconstructed as students moved away from their string instruments, one at a time, to add sounds and music using the DubDubDub interface on four, Internet-enabled laptop computers. The resulting mix of sounds from the Internet formed the middle section of the performance. One student searched for Google videos of violinists performing the same opening piece and this provided a simple conceptual link to the first section of the performance. The nature of the DubDubDub player meant that each performance was uniquely different because the content relies on *live* internet, in this case complete with its quirky connection status. The final movement of the performance involved the MC's and DJ's from Egerton High School and the extended school's project. They introduced and blended in some contemporary grime beats using an MP3 player, a CD deck and a cross-fade mixer. Quite naturally they started spitting lyrics over the resulting sounds. Through these lyrics they introduced themselves, who they were reppin (representing) and established their style. Much of this was freestyling (a kind of vocal improvisation) combined with the inclusion of existing bars (sections of lyrics) that they had written to suit the occasion. During this final stage of the performance the string quartet/DubDubDub players gradually moved back to their string instruments from the laptops and improvised with the MC's and DJ's. At the end of the performance all performers were contributing to the piece. The string players were improvising with the MC's and DJ's using the wider harmonics of their instruments to compliment the grime beats through

emulating scratch sounds, sub-bass riffs, bass drum grooves and claps. The original Baroque piece had been transformed through a DubDubDub-inspired breakdown into a unique presentation of improvised music and expression.

So, how did DudDubDub explore an alternative approach to social justice in music education?

1. By starting with the students.

"Adults fink they no bout lyf." (Lyric from UK TRAP delivered during
the DubDubDub project by 'Impulse', a Year 10 student
'reppin' [representing] the L.T.C. (Lyrically Talented Crew).

Egerton High School is a special school for students with social, emotional and behavioural difficulties in the metropolitan borough of Trafford in south-west Manchester. All students have been excluded from mainstream schools in the local authority. Many of the inspirational features of this work came from the students at the school themselves. For them, music, rapping, beats, DJ-ing and MC-ing are common features of a rich artistic sense of self-expression and a normal part of their day-to-day lives. Through working alongside these students as an artist, teacher and co-learner, the project leader developed an interest in how chance informed both his own and their work. In particular, the synergy between music, visual media and technology was a source of inspiration. The freedom of expression that this synergy brings allowed students to make sense of the ubiquitous violence and problems that permeate throughout their lives, sharing and communicating solutions through forming and performing in music-focused 'crews'. These groups include DJ's, MC's, beat programmers and producers. Lyric writing (the construction of 'bars') is prolific, their use of music hardware highly skilful and students are adept at using a range of freeware, open source and professional software tools for musical composition.

The effective engagement of these disaffected pupils at Egerton High School through allowing them to direct their own learning, develop a high level of multi- media ICT skills and develop their passion for music and verbal expression, led to early Expressive Arts GCSE examination entry and successful results for pupils aged 14 and above. It was this richly talented and artistic, yet challenging, group of young people that provided the opportunity to develop the DubDubDub project from a concept to reality.

Some of the key themes of social justice are fairness, equal access and equal ability to succeed. Working with such a potentially challenging group of young people has forced the staff at Egerton High School to think in a completely different way about the educational provision provided by the school. As these teachers know, this must start with the students themselves. A socially just approach to music education embraces students' natural

musical expression and uses this as a starting point for collaboration and enquiry. It adopts technologies that are familiar to students and explores these in creative ways rather than seeking to impose new or unfamiliar instruments within the classroom. It conceptualises music education within a relevant curriculum context that is relevant to their experience but which does not patronise them. Rather, it seeks to inspire and motivate them to succeed.

2. By promoting a responsive curriculum.

DubDubDub was part of a 'Super Learning Week' on Recycling. The timetable at the school was collapsed for a week and students worked in vertical groupings (i.e. with a mixture of students from each year) looking at aspects of recycling across the curriculum. There was an interdisciplinary emphasis to activities. The Expressive Arts programme of study related the work that these artistically literate pupils had been doing to the concept of recycling by re-using audio from the Internet in a random and non-linear way to form compositions. Entitled 'Recycled Audio Portraits', the students were free to use the Internet as they wanted for an hour providing that they recorded all the incidental sounds that they discovered through the computers' sound card. Students were informed that the resulting sounds would be used to create an individual aural portrait of their Internet usage. For this reason, it was suggested that they place an emphasis on visiting bookmarked sites so as to present as broad a reflection of themselves as possible. A complimentary task involving recycling prose by cutting words out of poems and picking them out of a bag at random to form new syllabic expressions. Pasting words in new orders reinforced the recycling concept and pupils were encouraged to record their new verbal pieces on the computer and mix it into their Internet inspired audio portraits. Many initial recordings drawn from the Internet were edited to fit the length of the recorded vocal track. This provided a simple way of delineate the length of the piece. All the finished tracks were mixed together by a pupil as an extension task and the result was played as part of a series of performances on the Friday afternoon that celebrated the work done during 'Super Learning Week'. Critical studies during the week included an investigation of the Dada and Surrealist art movements, including art, games and films, and the cut-up technique used and developed by William S. Burroughs and others as popularised by David Bowie.

The recycling of digital audio sourced from the Internet, along with the other simple sound generation ideas explored above, demonstrates very clearly how all students were given an equal chance to access musical composition within the project. This is not to say that all students succeeded equally within the activities. Judgements can be made about the appropriate selection of sounds, how they were edited, effected and mixed together, the

expressive impact of resulting pieces and their effectiveness in terms of the wider interdisciplinary project that the students worked within. It is important to note that this kind of musical composition is not a soft option. It is educationally and musically rigorous and demands a range of skills that students need to learn and a sophisticated musical understanding that can develop over time. The key point here is that the point of entry is accessible to the majority when compared to other types of musical composition that rely on conventional instruments or technologies. Part of the success of DubDubDub was the careful curation of digital technologies to ensure that all students were given an equal and fair chance to participate and succeed.

3. By carefully curating technology.

Audio exists on the Internet for a variety of reasons and serves a number of functions. It may arise incidentally by way of an embellishment to a corporate website or it may have a specific function such as a radio station. The DubDubDub player was a free, simple and intuitive performance instrument through which students could control live audio sourced from the Internet. It comprised of a specially prepared Internet browser with multiple tiled windows, basic volume and mixing controls, and video content sourced from Google Video (now You Tube).

The DubDubDub player worked on the principle that the various sounds contained within web pages will resonate together and that it is the user's skill, practice and sensibilities towards these sounds and processes that produce effective improvisations. This type of musical skill or understanding is not dissimilar to the sensibilities needed in a range of other musical activities with which pupils were familiar, e.g. through learning to play vinyl decks, CD turntables or PCs as instruments pupils were able to develop a range of transferable skills.

The creation of the DubDubDub instrument as an Internet browser-based instrument was an important element in its success. Original plans had been to develop a new piece of software and this did go through several design stages. However, the adoption of the 'Avant Browser' that, at the time, was innovative in its ability to offer the user multiple windows that could be tiled across the computer screen, together with independent volume controls for each window, proved to be a wise choice. It offered students a basic extension of the traditional browser environment that they were familiar with using to access the Internet. There were obvious limitations to this approach, not least that the triggering of live sound from numerous websites was not always a precise science, but this did not seem to concern students at all. As will be discussed below, this instrument can be categorised as an 'infra-instrument' (Bowers & Archer 2005, p.6). It allowed students to do one or two things very easily, at very low cost and with minimal traditional instrumental ability. But whilst instant musical engagement of this type

might be considered important in a socially just music education offer, this does not mean that it is unskillful and nor does it lack the opportunity for students to be musically expressive and creative. In fact, it allowed students a point of entry to a musical discourse that was richer and more diverse than they could have ever anticipated.

4. By sharing improvised music with 'the other'.

Prior to the first DubDubDub performance, a number of extended teaching sessions were held at Egerton High School with student teachers joining the group of school students. They worked with the school students to develop their skills with the DubDubDub player. During these sessions, the MCs and DJs shared their enthusiasm for music, demonstrated their skills and discussed ideas for the performance with the university students. There were many interesting conversations between the university students and schools around the construction of an indeterminate, process-orientated piece of musical performance, albeit with a range of pre-established reference points that informed their decision-making process (e.g. bookmarks of Internet sites, pre-written lyrical content and musical beats, etc).

We were pleased to note that both groups of young people were not afraid to explore the improvisational process as an integral element of the musical performance. More widely, many of them were able to incorporate ideas about improvisatory practices drawn from a range of other work that they had recently completed. For the students from the Manchester Metropolitan University, this included elements of improvisation pedagogy drawn from their Dalcroze studies, particularly principles from eurhythmics classes. For the Egerton High School pupils, the projects discussed above placed the DubDubDub project in a wider context of multimedia work centred around preparations for a GCSE in Expressive Arts (which pupils undertake in Year 9).

In some ways, it was hard to imagine two groups of students who could be more different in terms of their musical interests, instrumental experience and educational experiences. The Egerton High School students were male, brought up in south Manchester, and had all been excluded from mainstream schools in Trafford; the MMU students were female, string players, had music degrees and were studying for a postgraduate teaching qualification.

Yet these students found that they had much in common. The MMU students were intrigued by the technologies that the Egerton students were using. They enjoyed learning to use the various pieces of software and were even given lessons in using a DJ deck. Similarly, the string instruments played by the girls fascinated the Egerton High School students. This resulted in several impromptu violin lessons during the project! Musical conversations and engagement flowed quite naturally between the students

despite their apparent differences.

Music is not a universal language. The musical languages that these two groups of students were familiar with were, at one level, very different. But within the specific musical utterances and gestures within their favoured genres or styles, there was enough in common for these students to collaborate, meaningfully, with each other. The use of the digital technologies within DubDubDub provided a platform from which this could be facilitated. The technologies (traditional string instruments or Internet browser-based) were authenticated within the context within which they were used. It did not matter that they were simple or restrictive. For the teachers within DubDubDub, the key was to find a way to integrate music technology into inclusive musical activities, games, curricula and conversations with their students in a way that facilitates their creativity and engagement with music itself. This was the basis from which musical conversations with 'the other' could be initiated. DubDubDub proved that a socially just approach to music education that does not depend on students having had the opportunity to learn to play a musical instrument, or even having the ability to afford to buy a musical instrument in the first place. A shared and common musical passion and commitment brought together two contrasting sets of students and sustained a shared process of musical composition and improvisation which both found intrinsically rewarding.

Developing positive approaches to social justice in music education with technology

Up to this point, this chapter has presented two contrasting visions of music education with technology. The first is disappointing, characterised by segregation, stereotype and difference; the second is celebratory, characterised by simple technologies, collaborative working and a shared commitment to music expression. It is clear where the more socially just model is evidenced.

In broader musical life outside of formal education, contemporary musicians and artists are exploring the potential of new technologies as musical performance tools. In what is a very gradual, but well documented, process, these new technologies are beginning to be applied and explored within educational contexts in the United Kingdom (Savage 2005, Savage 2007). The whole skillset that underpins the use of these technologies is very different from a classical or conservatoire model of musical learning. Yet often, it seems, the world of music education has been slow to embrace change and has imposed sharp, negative, socially unjust and divisive categorisations of the type we explored at the beginning of this chapter.

DubDubDub has provided an alternative approach. It utilised a new type of musical instrument that was deliberately situated much closer to technologies that students were already using in their everyday live, i.e. the Internet browser. Blaine encourages us to reconceptualise the notion of a musical instrument for the 21st century (Blaine 2005, p.32) in line with lessons learnt from game theory. Specifically:

Musical instruments must strike the right balance between challenge, frustration and boredom: devices that are too simple tend not to provide rich experiences, and devices that are too complex alienate the user before their richness can be extracted from them. In game design, these same principles or 'learnability' are the fundamental principles of level design used to build an interest curve to engage players. (Blaine 2005, p. 28)

DubDubDub signals that the creation of such new instruments can lead to a more socially just and inclusive model of music education, where students with diverse sets of musical skill and experiences can collaborate meaningfully together. It is important to note that this did not require any particular changes to the classical instruments that were brought into the project. Quite the reverse in fact. These were a source of fascination and the compositional and performance opportunities they facilitated were highly valued by both sets of students.

Associated with this change in mindset, is the opportunity to reanalyse the process of musical performance and improvisation. There is an opportunity to get beyond the stereotypical notions of technique, interpretation and recreation as being central to instrumental performance and use new, technological innovations in such as way as to support the development of generic, accessible and intuitive musical performance skills.

Within the United Kingdom, it is unlikely that many of the broader social and economic issues associated with access and privilege in music education are going to change. Despite public programmes that give primary school students instrumental tuition for a short period, the reality is that students are not able to choose what instrument they want to learn, the continuation rates from this experience are poor, and the wider entitlement to a sustained instrumental music education are highly variable depending on which part of the country one lives in.

The opportunities for production of a socially just model of music education lie within the hands of the open-minded music teacher. Infra-instruments, based on the principles explored with DubDubDub, may be one way forwards. Despite the apparent reversals of instrument design (i.e. they are deliberately simple and easy to engage with), Bowers and Archer argue that they are nonetheless 'aesthetically engaging and technically intriguing' (Bowers & Archer 2005, p.6) and worthy of further study. Their findings have some relevance to our discussion here, particularly that infra-instruments are evaluated best within the context of a 'performance setting':

Handling an assembly of 'stuff' is often facilitated by an infra-instrument designing philosophy, where each device plays its part in a manageable hybrid environment. ... The whole performance setting becomes the unit of analysis, design and evaluation, not just a single 'new interface for musical expression' (Bowers & Archer 2005, p.6).

This reflects another theme in Bower's work, that of 'performance ecology'. This has a rich resonance for those involved in formal, classroom-based music education. By 'performance ecology', Bowers means a closer analysis of the places for practical action and its display to others (co-performers or audience). Examples include desktop performance ecologies (or even classroom performance ecologies) that may:

- Be differentiated (a place for the computational, for the acoustical and for other tools);
- Be integrated in a variety of ways;
- Allow opportunities for juxtapositions and for legible, embodied conduct (how performers look for, reach for, touch, communicate in non-verbal ways, etc).

These notions of 'infra-instruments' and a 'performance ecology' reminds us of the broader social context within which all music education takes place. Regardless of whether students are utilizing violins, laptops, the Internet, or a traditional score, the sounds, conversations and interactions that they facilitate need to be understood in the context of a wider performance ecology. An important part of this ecology is the requirement for it to be socially just. It needs to be fair to all, facilitate an equality in musical conversation and not bar anyone from being able to access it in a simple way. The DubDubDub project is an example of how extreme difference in terms of musical experience, types of musical skill and education opportunity does not need to be a barrier to meaningful musical engagement and production. The contingent practical context of music education is fundamental and integral to his process of creating music with technology. It is only through a strong commitment to allowing intricate relationships to develop that a true (or at least a defensible) understanding of what a socially just music education really is can be created.

Understanding these elements is important if we are to truly understand and know how that student's musical learning has developed within a social context. It is also crucial if we are to take meaningful actions against socially unjust models of music education of the type explored at the beginning of this chapter. Only by developing a rich understanding of the broad context within which that student's work has been produced then can you begin to understand why they have made their particular musical choices. This understanding is not helped by simplistic and reductionist categorisations of the type presented within our current examination system within the United Kingdom. The social forms of control that examination frameworks facilitate only serve to atomise our understanding of what

constitutes meaningful musical expression and prevents us considering the real essence of what it means to be a musician (and a music educator).

Conclusion

Technologies are integral to all music making, digital or otherwise. I would argue, philosophically, that there is not much difference between the development of the sustain pedal on the pianoforte in the nineteenth century and the latest Boss guitar effect pedal in 2014. Technologies of any type can help enforce the social order, or they can negate it and encourage alternative forms of expression; they can facilitate a meshing of ideas and responses, or they helpfully or unhelpfully disrupt them.

The rich technological context of music education extends beyond our choice of instruments and their use in educational settings. The broad array of technology that mediates our students' lives implicates, fundamentally, their engagement with us, as teachers, and music more broadly. One cannot escape this, and it is ridiculous to imagine that one can.

Within the United Kingdom, for the foreseeable future, teachers and their students will work within examination and curriculum frameworks that are seeking to divorce musical skills and processes from those categorised as being tainted with or by 'music technology'. This is a system that prioritises certain forms of knowledge in a simplistic and unhelpful way, e.g. the rewards of studying for an A Level in 'Music', as opposed to 'Music Technology' are more favourable (e.g. in accessing an undergraduate course of higher education). As we have seen, it also creates artificial and unhelpful barriers in terms of the gendered discourse surrounding music itself. They are socially unjust and serve to protect a musical elite and disempower large swathes of our young people in a most unhelpful way.

The study of music and the provision of music education within the context of an individual teacher's work is a location where it may be possible to begin to chip away at some of these socially exclusive barriers. Teachers have a responsibility **not** to buy into the narrative that music technology is only for some students, i.e. for those who cannot access music in the 'proper' way or who are male! They need to realise that the skillsets that they need to implement a broad and appropriate range of music technology

within their work is their own responsibility, and not something that should be hived off to a technician or support staff. Most importantly, their conceptual models for music education and how it is organised must be built upon an understanding of an authentic musicianship that embraces technology, of any shape and form, and sees it as integral to musical expression. Music technology is too important to be categorised as being solely within the domain of the 'digital musician' (Hugill 2008) and left at the doorstep in the experiences of so many others. Artificial categorisations only divide; what music education needs to develop first and foremost are students with a rich and authentic music expression regardless of the tools they choose to use.

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