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Rethinking teaching and learning pedagogy for education in the twenty-first century: blended learning in music education

Renée Crawford

Faculty of Education, Monash University, Clayton, VIC, Australia

ABSTRACT

In an increasingly technologically driven world, there is proliferate discussion among education and government authorities about the necessity to rethink education in the twenty-first century. The evolution of technology and its pervasive influence on the needs and requirements of society is central to this mindset. Innovations in online applications and social networking capabilities have accelerated in accessibility and popularity. As technological devices become commonplace, it is understandable that curriculum documents and education policies around the globe are littered with statements about Information and Communication Technology (ICT) expectations and achievement level standards. There is no argument about the presence of technology or that it should be embedded in education. However, there is a case to be made about revealing the potential of technology for teaching and learning and the necessary associated pedagogical considerations. This article explores the outcomes of an online music education project used in a blended learning context to provide high quality music learning resources to Australian rural and remote schools.

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Music education; blended learning; music technology; authentic learning; multidimensional/non-linear teaching and learning model; teaching and learning pedagogy

Introduction

Proposals for educational change and reformation in a contemporary and fast-paced world are inevitable. Throughout time each era has presented the practice of music teaching and learning with a number of opportunities and challenges. The digital age is no exception. Barrett and Webster (2014) concur that we live in a rapidly changing and highly connected society where music has never been more evident in the lives of people of all ages. However, it is remarkable that in such a context, 'much of how we formally teach this music is stuck in age-old theories and practices … What is desperately needed are new ways to conceptualise and execute music teaching that respect past achievements but also look forward to new paradigms' (Barrett and Webster 2014, 1).

The necessity to rethink teaching and learning pedagogy for education in the twenty-first century has emerged as a result of the growing and changing needs and requirements of society. Education and government authorities continue to express concern about the significant disparity between what occurs in the classroom and what occurs in real-life contexts (Crawford 2009b, 2014). Curriculum and education policy documents in Australia such as the Melbourne Declaration (Ministerial Council on Education, Employment, Training and Youth Affairs [MCEETYA] 2008) and national curriculum (Australian Curriculum [ACARA] 2015a) identify the importance of developing lifelong learners within authentic and real-life contexts. Embedded within this is the expectation that students should, 'learn to use ICT [Information and Communication Technology] effectively and

CONTACT Renée Crawford renee.crawford@monash.edu Faculty of Education, Monash University, Clayton, 29 Ancora Imparo Way, Clayton, VIC 3800, Australia

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appropriately to access, create and communicate information and ideas, solve problems and work collaboratively in all learning areas at school, and in their lives beyond school' (ACARA 2015b).

As an extension to the ideas behind Web 2.0 technologies, the term 'School 2.0' is currently being used to describe the schools of the future (Gerstein 2013; Hargadon 2015). There are three factors contributing to this shift in thinking:

(1) New collaborative computer technologies which include distance and online learning, free and open source software, videoconferencing and read/write web.
(2) A transitioning economy (the industrial age through to the information age and to the current digital age) has redefined societal expectations and requirements in what is considered valued knowledge and essential skills.
(3) New technologies fostering a culture that is transparent, multidimensional and collaborative allowing open discussion about many aspects of society, particularly education.

In response to this economy driven shift in thinking and finding a way to enhance music education for young people, there is an increasing number of high quality online resources and applications available to teachers and students. For example, *The Sound Exchange* is a website hosted for the educational activities undertaken by the Philharmonia Orchestra, a vision originating from the research carried out by Olivia Lowson in 2000 (Philharmonia Digital Projects 2012). This interactive website has been evolving for several years and will continue to develop its rich resources, sample libraries, forums, live concert webcasts, online composer workshops, new music education videos and online and offline events. Initial funding was supplied by the Arts Council of England in 2002, which allowed for the commission of Professor Hugill who began working on the original core resources. The website and project is now supported by the David and Elaine Potter Charitable Foundation. Their mission is to, 'continue to add new resources, run cutting-edge interactive projects and push the boundaries of what is possible' (Philharmonia Digital Projects 2012). In 2012 the Philharmonia Orchestra launched an iPad app called *The Orchestra* with Principal Conductor and Artistic Advisor Esa-Pekka Salonen. This collaborative project is an innovative way of introducing an audience to the inner workings of the modern orchestra (Philharmonia Digital Projects 2015). Another exemplar is an interactive website on 'Music Improvisation' by the Berklee College of Music titled *Berklee Shares*, which has been evolving since 2003 (Berklee College of Music 2015). The provision of online lessons and performances are some of its primary features. A range of popular music topics such as production and technology, music business and song writing and arranging are offered. Using the technology applications and resources highlighted in these exemplars not only resonates with people of all ages and aligns with the thinking of a digital society, but they make music and music education from all over the world more accessible.

Despite the availability of these high quality resources for teaching and learning, such as the exemplars described here, formal music education in Australia is still being approached in a traditional model of schooling in many instances (Crawford 2009b). That is, using technology as a one-way information base, not an interactive information exchange for creative exploration and artistic expression. Further, much international research on teachers' use of ICT in music education not only describes a low level of usage in a digital age, but in turn minimal pedagogical change (Mills and Murray 2000; Pitts and Kwami 2002; Hargreaves, Marshall, and North 2003; Ho 2004; Button 2006; Crow 2006; Savage 2005, 2007; Voogt, Knezek, and Somekh 2008). This article explores the outcomes of the Interact Music Project (pseudonym). The conceptual framework and principles of a multidimensional/non-linear teaching and learning model (Crawford 2014) was adopted as a basis for an online music education platform to be used in a blended learning context. This project was designed to address an important gap in the provision of music education programmes across a number of rural and remote schools in Australia using a range of Web 2.0 technologies. The teaching and learning outcomes of this project not only identified the benefits of such an approach, but highlighted the need for pedagogical change.

Evolving technologies require a different approach

Globally, people of all ages have embraced technology that encourage inherently open and social participation. In fact in Australia, social networking has accelerated in popularity over the past couple of years in line with the rest of the world according to *comScore*, United States-based global leader in measuring the digital world and digital intelligence (Radwanick 2009). In 2013, 12.8 million people in the UK went online via tablet (Radwanick 2013). This surge has come in support of a change in the way the Internet or web is both perceived and used. Web 2.0 has been in transition for several years and defined as 'the second stage of development of the Internet, characterised especially by the change from static web pages to dynamic or user-generated content and the growth of social media' (Oxford Dictionary 2015). The Web has morphed from a medium in which information was simply transmitted and consumed, into a platform where content is created, shared, remixed and repurposed in interactive ways, fulfilling Berners-Lee's (1999) original vision of the Web. People are no longer merely using the Web for reading books, listening to the radio or watching television, but are having conversations consisting of a visual and multimedia vocabulary. Web 2.0 does not only look like a network, but behaves like one. By definition, Web 2.0 is used to describe 'applications that distinguish themselves from previous generations of software by a number of principles. These new, Web 2.0, applications take full advantage of the network nature of the Web' (Ullrich et al. 2008, 705).

While there is evidence of societal acceptance and requirements for the way technology is used and interacted with in Web 2.0 platforms (social networking and various online multimedia) are not being used widely in music education. 'Research shows convincing examples of using Web 2.0 services for learning … the relationship between Web 2.0 technology on the one hand and teaching and learning on the other hand are still rare' (Ullrich et al. 2008, 705). It is important to recognise that with any new technology there are associated challenges and complexities. In the education sector this disparity is still largely evident due to pertinent issues concerning cyber safety, cyber-bullying and accessibility of inappropriate content. However, discussing such technology only in terms of a school policy cyber safety strategy, where concerns of site blocking and cyber-bullying overshadow the benefits of its use is no longer relevant. While schools have a responsibility and fundamental duty of care to students which makes site blocking and monitoring web content a necessary component of school policy, so too is educating and skilling our young in ways that will allow them to be active participants of society. Embedded in education policy and curriculum documents are the requirements for students to not only develop capabilities in using ICT in a range of contexts and for a diversity of purposes, but also to gain confidence in learning to cope with rapid changes in the evolution of technology and the exponentially increasing complexities of the digital environment. This includes awareness of the challenges and dangers of a digital environment. For example, the Australian curriculum states that ICT capability involves students, 'learning to make the most of the digital technologies available to them, adapting to new ways of doing things as technologies evolve and limiting the risks to themselves and others in a digital environment' (ACARA 2015c).

One of the most significant changes ever experienced in human history is arguably the exponential rate at which the world has moved through the agricultural age, the industrial age and into the information age (Toffler 1981, 1990; Pilzer 1990; Huitt 1999). As a result of the industrial revolution in the nineteenth century, education transformed from apprenticeship to universal schooling. Collins and Halverson (2009) explain that in the apprenticeship era, 'most of what people learned occurred outside of school. Universal schooling led people to identify learning with school, but now the identification of the two is unravelling. All around us people are learning with the aid of new technologies' (1). The information age laid the foundations for the current digital age where there is an increasing use and reliance on digital technologies. It is having a profound effect on the way that people, especially young people, access knowledge, interact, create, collaborate and learn. This needs to filter through to educational settings if learning and teaching is to occur in a contemporary and relevant way that replicates real-life and authentic practice. Technology and

Web 2.0 platforms resonate with our young because it is the ways in which they interact and engage in real-life contexts.

In addressing education pedagogy it is important to ask how this new technology changes the epistemologies of what may or may not be taught in schools. To understand the pedagogical changes required, it is first necessary to evaluate the implications of such technology, its challenges and benefits for teaching and learning music. It is critical to acknowledge that teachers require appropriate professional development and support to change their pedagogy accordingly in a rapidly evolving digital environment. The Interact Music Project is an online music education platform used in a blended learning context which demonstrates a positive example of what can be achieved when teachers are provided with the necessary support and information to adapt their pedagogy accordingly.

Multidimensional/non-linear teaching and learning model used in a blended learning context

This project highlights the advantages of embracing new technology for learning and teaching within a safe and teacher facilitated environment. While it has been noted that technology should not replace the need and requirement for good teachers (Rosenberg 2011), online learning is an important development in education today. A combination of traditional and face-to-face instruction with online learning has resulted in a concept known as blended learning, which is becoming widely used (Digolo, Andang'o, and Katuli 2011).

Pedagogically, blended learning aims to incorporate the most effective aspects of face-to-face classroom learning experiences with comparatively as good mobile and online learning experiences (Ruthmann and Hebert 2012; Pike and Shoemaker 2013; Tobias 2013). This allows:

- An increase in learning outcome measures and lowering of attrition rates compared to fully online courses (Dziuban, Hartman, and Moskal 2004).
- An opportunity for students to practise technology skills in navigating online course materials and creating their own digital content for assessment.
- An increase in student to teacher and peer interaction through the use of communication tools like discussion forums, blogs and shared web content on the electronic whiteboard.
- The ability to reserve face-to-face time for interactive activities, such as higher level discussions, small group work, debates, demonstrations or in-class activities.

From a learning perspective, blended learning resonates with how students engage and interact with technology in real-life contexts, including:

- Flexibility and the freedom to learn anytime, anywhere.
- It is student centred, which includes some level of control over the pace of their learning. Difficult concepts can be reviewed as often as necessary.
- More engaging content that they can create and use their own initiative and networks to shape (for example, collaborating with other students from different schools on musical compositions).
- The opportunity to engage and draw on expertise that would otherwise not be available to them without costly travel, such as in the case of music education: virtual conferencing with high level musicians and composers, virtual excursions to concerts, musical events and overseas historical or culturally significant landmarks.

Using this blended learning context the music project was then pedagogically aligned to the conceptual framework and principles of a multidimensional/non-linear teaching and learning model (Crawford 2014). This model considers the necessity of incorporating technology in education and in particular music teaching a learning practice in an authentic and effective way. This resonated

with the intensions of this project, which was to use technology in an authentic way that utilised blended learning to deliver high quality music education experiences. The philosophical and theoretical basis for this model relies on three interrelated ideas (Crawford 2014):

(1) Valued knowledge – Learning content including skill development and mode of delivery should be considered relevant and necessary to societal contexts. There is a tension between what schools understand as valued knowledge in education and what students actually value.
(2) Authentic learning – Teaching and learning should be experiential and emulate real-life learning contexts. One of the issues with students' engagement in school music is that it does not relate to their real-life experience and therefore not considered authentic.
(3) Multidimensional/non-linear learning – Teaching and learning practices should be a reflection of current society, which is multifaceted. This should include the seamless integration of interactive technology.

These three contentions, working simultaneously, introduce the notion of a holistic perspective and practice of learning, which is further defined and referred to as the 'whole-person phenomenon' (Crawford 2014). This research as well as this current study are important as the developments and use of technology and blended learning in music education have been modest compared to other disciplines (Southcott and Crawford 2011).

An interactive online music education project

The online music education project was designed to fill an important gap in the provision of music education programmes in regional and remote schools using a range of Web 2.0 technologies. While there are examples of other projects that have used or evaluated online applications such as Skype and YouTube for online- and Internet-based music education (Cayari 2011; Brandstrom, Wiklund, and Lundstrom 2012; Kruse et al. 2013; Kruse and Veblen 2013; Waldron 2013), research on the impact of Web 2.0 technologies used within a blended learning context is still expanding (Pektas and Gürel 2014). This investigation will contribute to the knowledge in this area of study.

Three project aims were devised in response to the paucity of music education in the identified target areas:

(1) To provide students and teachers within rural and remote schools access to high-quality learning materials and resources.
(2) To facilitate the use of online music technology in a blended learning context and engage students with developing online music compositions and soundscapes.
(3) To build capacity within these schools to enable music education and the use of online music technology to continue beyond the completion of the project.

The premise for this project was to find a sustainable way to provide musical experiences including learning materials and resources to students and teachers in schools where opportunities to attend for example, elite quality concerts can be challenging due to location and cost. Therefore, new technologies and Web 2.0 platforms were used to enhance learning experiences, which are relevant to real-life, which many of these students would otherwise not have had access to.

It had been identified that regional and rural schools and communities with disadvantaged student populations are a key area of need for the provision of music- and arts-based programmes. In such a context, music and the arts were used as a vehicle to engage young people in low socio-economic areas and provide musical experiences and opportunities for these students. Music specialist teachers incorporated this project into their curriculum, where students would access a range of interactive and visual music learning resources such as instrumental lessons and practice techniques,

composition, performance skills and listening activities. Students were guided in developing music composition skills using a piece of audio software called *Audacity* (http://audacity.sourceforge.net/). This fast multi-track audio editor and recorder has features that include envelope editing, mixing, built-in effects and plug-ins. Students create their own compositions and share their work on the Interact Music Project website. A key element of the project is the use of a blog allowing students and teachers to share, collaborate and comment on their compositions. Blogs and social media have been used in informal music learning for a number of years (Salavuo 2006, 2008; Partti and Karlsen 2010; Waldron 2013), this project sought to formalise this practice. A teacher from one of the participating schools has indicated that, 'the feedback was rather amazing. It's something that as a teacher I never actively sought, until I started using Web 2.0. The kids just seem to do it naturally'. New communication technologies provide remote access to city-based musicians as a supplement to the work achieved in class. Online video conferencing workshops are run with expert musicians from various professional orchestras and bands. The online music workshops are webcast from the studios in the main city. Through the use of online classroom software *Elluminate*, the students are able to listen to elite musicians and then ask questions and make comments by typing into the chat window. *Elluminate* unifies technologies such as video and web conferencing, phone, instant messaging, learning management systems and social networks to ensure that learning collaboration is fast and efficient. Avrhami (2010) explains that this new approach called 'Unified Learning Collaboration' (ULC) addresses the needs and requirements of current academic institutions and training organisations:

> To make teaching and learning more self-enabled and interactive, while providing cost savings and rapid return on investment. This unique approach supports the creation of a comprehensive infrastructure for learning that includes 'people, processes, learning resources, policies, and sustainable models for continuous improvement' identified by the latest U.S. National Educational Technology Plan.

The impact these experiences are having on students' learning is invaluable, with teachers confirming immediate increased levels of student engagement and interest.

Some of the greatest challenges facing educators are access to technological resources and the ability to use technology effectively with limited time for professional development opportunities (Crawford 2009b). The technological applications used for the Interact Music Project were sourced with both capacity building and user simplicity in mind. All the software used was easily accessible and either free or already purchased by the Department of Education and Early Childhood Development (DEECD) for use in schools. For example, existing licences were used for *Elluminate* virtual classroom software that was used for the online music workshops. As previously explained, students created their compositions using free open-sourced software *Audacity*, which many schools already had installed and utilise.

A technological issue that the project encountered concerned bandwidth. This is the speed at which data are transferred, also used to refer to the maximum capacity or the fastest that a connection can move data. The live video conferencing did stretch the bandwidth capacity of some schools, but become less of an issue once this was addressed. The other aspect to consider was that schools were charging their students for internet usage. Due to the project requiring a large amount of bandwidth per student, this resulted in some students paying extra for access to the project or being locked out because they had no credit left. The DEECD have since made the decision that students should not be charged for bandwidth, which was a positive outcome and recognition of the value of such technology to enhance music learning.

Methodology

In order to evaluate the three project aims mentioned earlier, research was conducted to measure the impact that the project was having on both the students and teachers involved. The two primary research questions were:

(1) What impact does the Interact Music Project have on students' learning when used in a blended learning context?
(2) What impact does the Interact Music Project have on teachers when used for blended learning?

The intention was not to find out if students could use the technology, but to assess their learning through their interest, engagement, progression through the online learning modules, uptake of an instrument and monitored usage patterns (whether students were logging on to the website in addition to when they used it in class). It is realised that a longitudinal approach to measuring these identified categories over time would have been beneficial, particularly given that many external and internal factors influence music and instrumental learning, thus requiring monitoring over time. While this is noted as a limitation of this study, there is still significance in the results to justify consideration.

A mixed method approach (Creswell and Plano Clark 2011) to this research was taken consisting of participant surveys, semi-structured interviews with the Project Manager and statistics generated from project technicians who monitored the online activity. The Project Manager interviews have been omitted from the results as the data were not considered critical to the focus or context of this paper.

To avoid interruptions to the project, it was important that the survey used for the teachers and students was designed in a completely nonintrusive way and regarded as an assessment or progress tool, rather than a research instrument. This ensured that the research and evaluation component of the project were both reliable and valid. In accordance with ethical requirements all project participants had consented to the research being conducted, but it had a double purpose for them. Consonant with the commitment to the ethical standards, it was also ensured that because teachers were granted access to students' responses for the purpose of assessment and reporting, that no sensitive data was collected. The survey questions were framed to capture both valuable quantitative and qualitative data. In accordance with ethical requirements, pseudonyms have been employed to preserve the anonymity of the organisations, teachers, students and schools involved in the project; this includes preventing the disclosure of their location.

Results were collected over the duration of a one-year period in the form of online survey data from both the students and teachers utilising the Interact Music Project. Collection points occurred three times during the year to capture pre, middle and post opinions and progress. This also allowed the assessment of learning to be measured against interest/engagement and programme usage. It was also an aim to capture the confidence levels of the teachers using the technology to facilitate music learning.

Using a combination of Google Analytics and another tracking programme (not disclosed by the organisation used), the technicians working on the project were able to monitor student usage, which was more than just the basic log-on activity. They could identify specific student activity based on what students clicked. Monitored online activity was also collected to coincide with the three data collection points of the survey. This further ensured the reliability of the data collected. For the purpose of this study a sample size of 20 Year 7 and 8 (ages 12–14) general music classes in secondary schools consisting of 20 teachers and 440 students is used. To protect the anonymity of the participants and schools involved in the project, the locations have not been disclosed. However, the aim of the project was to provide vital music education resources in regional and remote schools using a range of Web 2.0 technologies. In addition to the technical analytics, the remaining quantitative data were analysed using basic statistics and frequency and the qualitative data were analysed thematically.

Results of a blended learning approach to music education

The following table demonstrates part of the baseline data collected to capture the confidence level of teachers prior to their use of the Interact Music Project, then half way through the year and finally at

Table 1. Teachers' confidence levels across the project year.

	Pre project				Middle of project				Post project			
Confidence level ($N = 20$)	Not at all	Minor extent	Moderate extent	Major extent	Not at all	Minor extent	Moderate extent	Major extent	Not at all	Minor extent	Moderate extent	Major extent
Technology for music in the classroom	10%	10%	50%	30%	–	10%	60%	30%	–	–	40%	60%
Digital learning in the classroom	10%	10%	50%	30%	–	10%	60%	30%	–	–	40%	60%
Supporting student self-directed learning	–	20%	50%	30%	–	–	70%	30%	–	–	30%	70%
Music technology in the classroom	20%	20%	40%	20%	–	30%	50%	20%	–	20%	40%	40%

the conclusion of the school year. As explained, a representative sample used for the purpose of this article is limited to 20 teachers.

Table 1 indicates a steady increase of confidence levels in all four categories as the year progressed. This can firstly be attributed to the simplistic fact that the more teachers used the technology and were familiar with the digital blended learning environment, the more confident they became. Secondly, this project had a comprehensive support network and mentoring system available for facilitating classroom teachers. Much previous research has outlined that one of the factors in the reluctance of teachers using technology in the classroom is feeling unprepared or that they lacked training (Crawford 2009b). Teachers expressed that the design of this project negated this issue. This is also supported by a study by Voogt, Knezek, and Somekh (2008) who identified that teachers' beliefs, attitudes, confidence and competence with ICT remain centrally important in their adoption of ICT into their pedagogy. Not only were they using technology in an innovative and multidimensional way, but they could see the immediate value for their students' learning.

Teachers were also asked whether they thought that the online aspect of the Interact Music Project and blended learning approach impacted on their students' learning progress throughout the year. As a general observation 30% of teachers said that they felt that their students learning progressed quite well as a result of the music project, while 70% said it had a major impact overall. The teachers were also asked whether they thought the blended learning approach enhanced their students learning, 20% agreed to a moderate extent, while 80% stated that it had a major influence. Teachers were in overall agreement that the learning of their students progressed consistently and that the blended learning approach did in fact enhance their students' learning in some way.

Data were also collected from the students participating in the project. The representative sample used for the purpose of this article considers only the students in the classes of the teachers discussed. The student sample totals 440 individuals from Year 7 and 8 general music classes. The following series of graphs outlines the results for the identified measurement categories for the students at the three data collection points throughout the year.

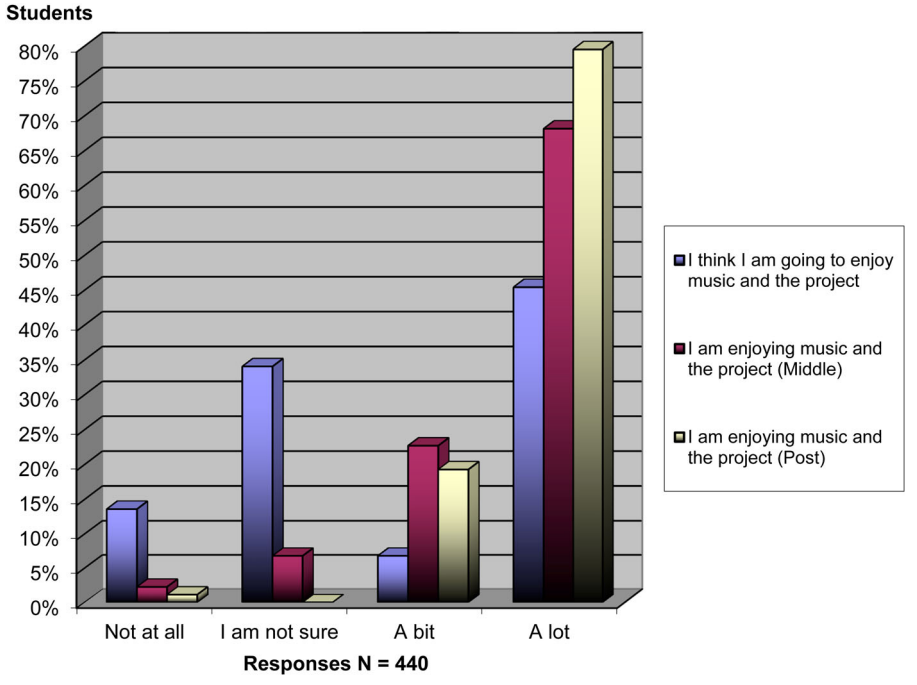


Figure 1. Students' interest level in music and the project.

The graph in Figure 1 demonstrates a steady increase in student interest and enjoyment of both music and the project overall as the year progressed. It is interesting to note how the uncertainty about the project at the beginning of the year changes to a positive, even for those students who were convinced they would not enjoy it at all.

Figure 2 indicates that more than half (56%) of the student participants either did not think they would like playing an instrument or was not sure at the time. By the middle of the project this measure decreased to 32% and then 1% by the end of the year. The gradual increase in interest for playing an instrument was extremely positive as the students progressed through the year. The students' feedback also supported that they were both interested and engaged in music learning through this blended learning approach. The following examples of student comments from the post data time point also highlighted this:

These qualitative comments in Table 2 demonstrate engagement with learning in an authentic way, particularly in the ways in which students were making music. The nature of engagement is a challenge to measure accurately, however the exemplars indicate how the music project effectively accommodates different learning styles, musical skill levels and interests.

The correlational link between the music project and interest and engagement is further supported by the increase of student instrument uptake throughout the year. The graph in Figure 3 shows that by the middle of the year, 68% or 300 students had taken up an instrument. At the conclusion of the year, 410 of the 440 students involved had taken up an instrument. Therefore, 93% of students participating in the project made a decision to take the opportunity that they were presented with and learn an instrument by the conclusion of the year. This is a notable increase of 110 students who chose to take up an instrument from the middle to the end of the year. The types of instruments students had the opportunity to learn as an instrumental music option through the project were guitar, keyboard, percussion and ukulele. Singing was already done as part of the classroom programme in many cases.

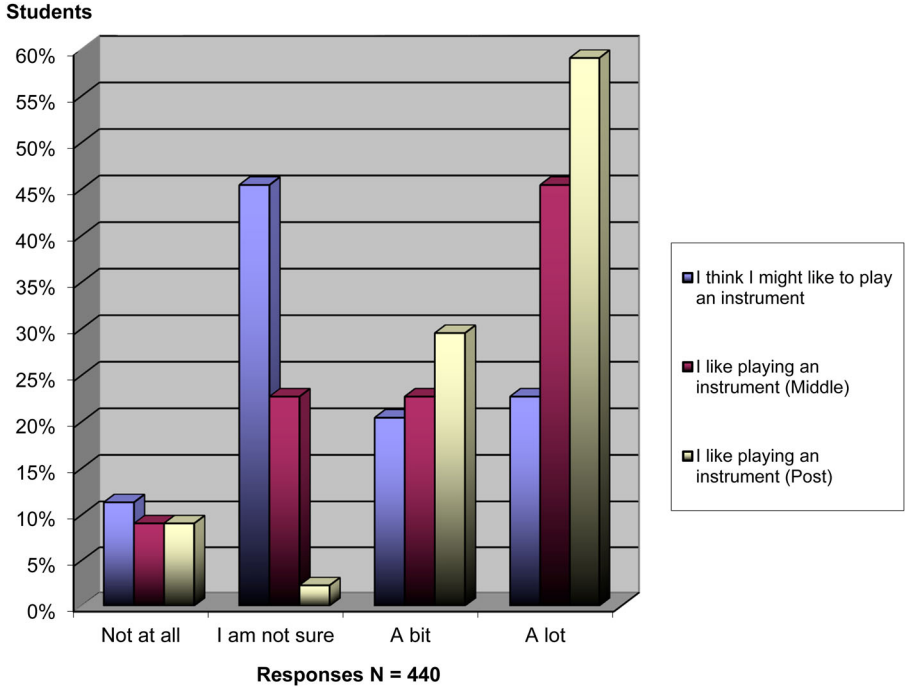


Figure 2. Students' interest level in playing a musical instrument.

Table 2. Student' interest and engagement in music and the project.

Student	Exemplar student comments
No. 1	I didn't like this but then I did coz I could make beats and sounds like real music. Like from Pit Bull or something. [Student] from [Secondary School] even used my beats. They put a base with it. Was cool. [Student] added the rapping on top.
No. 2	I really like being able to talk to the musicians from the orchestra. They were so funny. They answered all my questions, even the silly ones.
No. 3	It was good that we could talk to other students in other schools about what we were doing. It really helped me. Like [Student] from [Secondary School] gave me ideas about the song I was writing. It made it heaps better.
No. 4	I didn't think I would like music or playing an instrument, but I really like drums. Maybe I could get good and be like Dave from the Foo Fighters.
No. 5	I hate school but music is fun for once.
No. 6	I like that the practice videos are set at different speeds. Sometimes it's hard to get a riff, but having it shown how to play it slow then faster and faster helps heaps.
No. 7	I have always wanted to write a song, but can't read music. I have written a pretty cool song and I didn't even need to know music. But I can a bit now too, because it shows you the notes as well as the loops.
No. 8	I hated classical music, still not my thing, but the musicians are funny. You can see how each music has the same things, like percussion [rhythm], melody. But I like singing the best. I go to do a song it was really fun.
No. 9	One of my favourite things about music I think was seeing the performances. They were live and we got to talk to the performers afterwards sometimes too. We don't have things like that [here] so it is the first time I have seen this. It would be even better in the hall, but this is pretty good, because we wouldn't see it all.
No. 10	Being able to work with the music experts online was amazing. They gave me good ideas and helped me with my work.
No. 11	My song got played at assembly, OMG I thought I would be embarrassed,
No. 12	I like being able to talk to my friends after school about the things I am working on for music, it really helps to be able to share your ideas.
No. 13	I don't like doing stuff by myself, at least in music I could work with others to help get things done.
No. 14	I like posting things and getting ideas back from ppl [people].
No. 15	Can't do music, like read it, but still made a song and learnt to play a bit so I can read a bit now. I play the uke for my lil sis [little sister].
No. 16	I really love music class, being able to play an instrument and learn to write songs is great. I actually didn't know I would enjoy it and turns out I'm good at writing lyrics. Gives me a chance to express myself. I also really enjoy writing lyrics for my friends in class and I even have friends in other schools who I help too.
No. 17	It was good not to feel under pressure all the time. Being able to work through the activities at my own pace helped and I probably got more done that way as I wasn't worried all the time. Different to other classes where I don't; do so well. My friends gave me inspiration too, so I would finish things because I wanted to show what I had done.
No. 18	Being able to work like a real songwriter is pretty cool. Sampling and remixing of my friends work is something I like doing. A bit like a DJ or producer I guess!

Another important factor in considering the value of this online music platform was to identify whether it was being used outside of school time and in what ways. The next two graphs illustrate both how the students indicate that they used it and what the actual monitored usage was at the three time points.

There is a quite a notable shift in student attitudes towards the music project thinking that they would not enjoy it or ever use it outside of school time at the beginning of the year to actually making a conscious decision to use it for their own learning. Some of the initial qualitative data indicated the stigma of anything school related being attributed to 'work', 'not fun' or not considered valued knowledge. From engaging in the project students were proactively watching concerts, having private lessons, collaborating on songs and for participating in discussions with peers. Therefore, this activity was not simply a case of setting homework tasks or finishing class work. As stated in the methodology, using a combination of Google Analytics and another tracking programme (not disclosed by the organisation), usage of the platform was monitored by the technicians involved. They could identify specific student activity based on what students clicked, not just a basic log of activities. To provide an indication of the quality of the monitored usage, the parameters provided included activities that accessed specific learning activities or engaging in forum discussion specifically about music or the module tasks in some way. This was possible as the site was moderated. Therefore, the following monitored usage graph consolidated these parameters and was collated to coincide with the three data collection points. It is recognised that there are limitations to capturing only a snapshot of data at certain time points, but this has been triangulated with other data collection at the same time points.

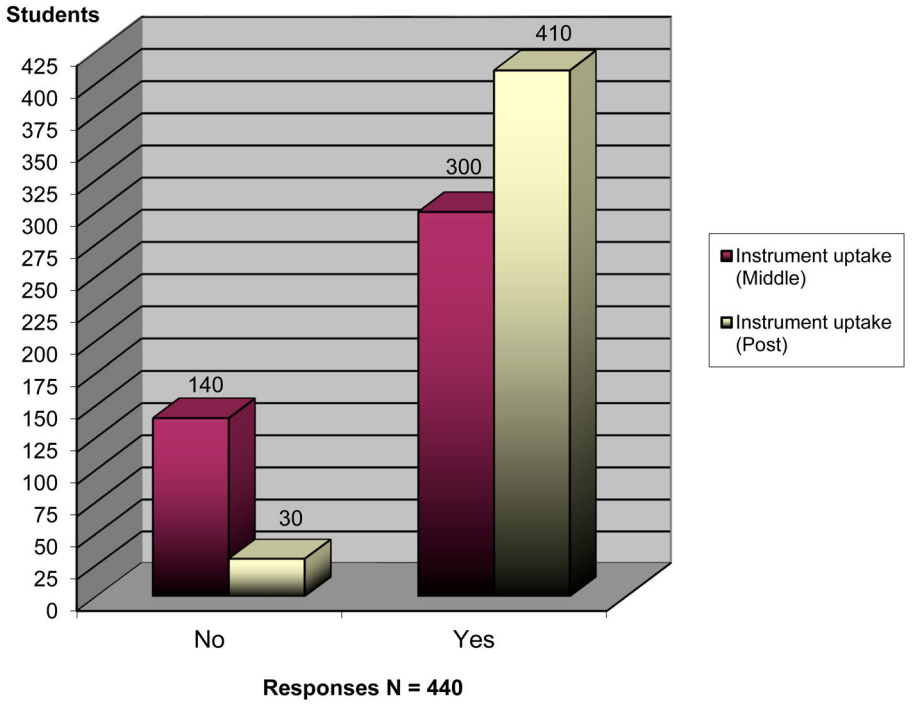


Figure 3. Student instrument uptake.

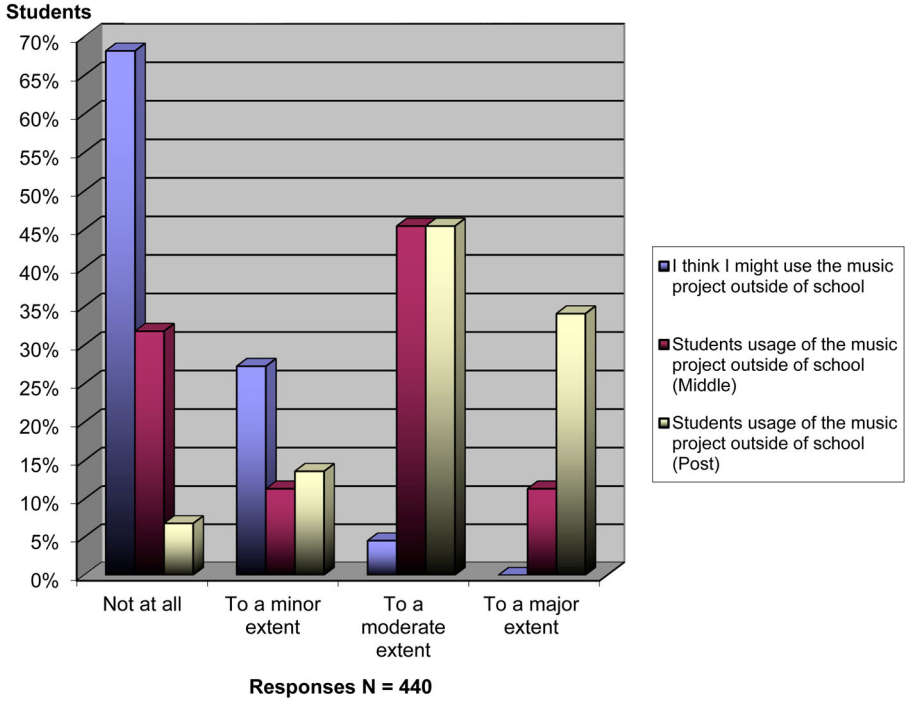


Figure 4. Student use of the music project outside of school.

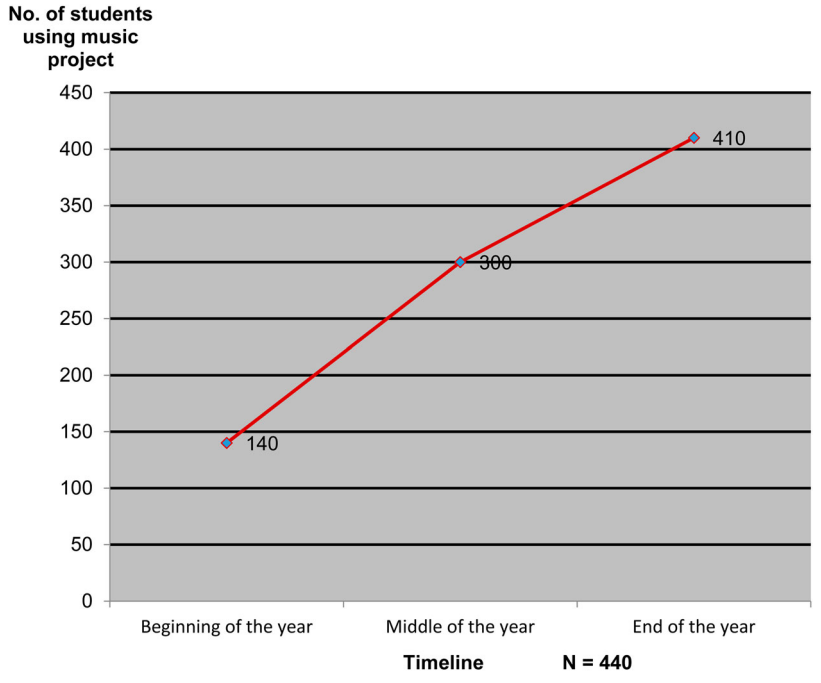


Figure 5. Monitored student usage of the music project outside of school time.

The actual monitored usage in Figure 5 affirms student responses in Figure 4. This is valuable given that there are at times issues when doing research involving student participants who may have a tendency to provide expected rather than actual responses. There is a notable increase from the beginning of the year when only 140 students or 32% said they think they would use the music project outside of school time. Half way through the year the figures indicated that 300 students or 68% were using it outside of school time and this further increased to 410 students or 93% by the conclusion of the year. This is not only supported by the steady increase in student interest and engagement in Figure 1, but the fact that many of the students decided to learn an instrument. It is acknowledged that the needing to access the lessons and practise sessions would increase outside of school time usage. Music teachers also encouraged use of the online resource outside of school. The value of this project was that it enhanced the music learning of students both in and out of school, through the use of technological tools that young people have become accustomed to using when communicating, socialising, playing and working. The schools, teachers and the community supported this innovation as all of the activities were conducted in a safe and monitored environment. It is also important to note that one of the assumed issues with interaction online was thought to be confidence in sharing ideas freely, collaborating and participating in discussion forums. However, this was not the case with these year 7 and 8 students. It would be reasonable to suggest that this further highlights how comfortable the younger generation are with navigating and using these innovative technologies and Web 2.0 platforms.

The primary content to be used in the classroom was designed as 10 learning modules to be set during the course of the year and is generally expected that by the middle of the year students will have progressed to the end of module 5 and subsequently module 10 by the end of the year. This is a self-directed student learning approach so that students may take as much time as they require and the teacher will facilitate where necessary to assist students along. There are extension activities in each module for advanced students and in general they cater for different learning levels. Modules were designed in alignment with the Victorian Essential Learning Standards (VELS) as a curriculum framework. The progression points from VELS were also used to assist in distinguishing module

levels and age appropriate content (Victorian Curriculum and Assessment Authority [VCAA] 2009a, 2009b). It was decided that monitoring students' progression through the modules in terms of which learning module they have completed according to the expected time frame would be valuable for two reasons. The first is in verifying and providing a basis for modifying module levels according to student learning levels and the second is as a way of providing the classroom teachers opportunities to assess their students' progress. At the assessment point in the middle of the year 9% of students had completed learning module 4, 86% module 5 and 5% module 6. By the end of year assessment, 2% of students had completed learning module 9 and 98% module 10. This is an extremely positive outcome that was certainly assisted by the fact that the students enjoyed learning music using the blended learning approach. Although this project was only measured over the course of a year and the sample size is modest, these results confirm that the multidimensional/non-linear teaching and learning model and blended learning contexts need serious consideration.

Discussion and conclusion

Specific music education policy and curricula documents in Australia often imply that ICT is 'offering a different set of tools to support music education, much as a new set of percussion instruments might do' (Southcott and Crawford 2011, 124). This limited understanding of the use of ICT simply as a tool is further identified by Mark and Madura (2010) as computer-aided instruction (CAI). In this approach the potential benefits of technology in music education are reduced simply to teacher-led musicianship activities such as aural training and the acquisition of notational skills. This didactic and teacher-centred approach is further highlighted by Crawford (2009a) who confirms that technology was used frequently in the United States as CAI supporting a highly structured teacher-centred classroom setting that promoted intensive skill development. This is in contrast to the way technology was used in the music project.

Mills and Murray also assert that when students worked primarily as musicians that technology could enhance music lessons (Mills and Murray 2000). This authentic approach was also supported by Bray, Brown, and Green (2004) who suggested that, ICT has the potential to enhance creativity, facilitate learning, and encourage exploration and independent learning. Technology used in this setting can be identified as computer-aided learning (CAL). This approach to using technology in the classroom was first adopted by music teachers in the United Kingdom where they, 'supported a curriculum promoting creativity and independent learning. This less skill-intensive approach was considered more suitable for general music classes and encouraged problem solving' (Crawford 2009a, 154). This view that technology be used in music education for the purpose of either CAI or CAL alone is no longer relevant to contemporary music education paradigms. Results from the impact of the music education project and other similar studies (Hitchcock 2008, 2009; Hitchcock et al. 2010; Borota 2011) provide growing evidence that technology should be used in a blended learning approach that promotes teaching and learning in a collaborative and holistic way.

Educators would be naïve to think that in the digital age of the twenty-first century that classrooms and pedagogical expectations will not change. Cain (2004) states that classroom practices should 'keep pace with the world outside' (219). Technology provides an important platform in the ability for music educators to close the divide between their students' experiences of music in the classroom and outside. Part of what the results from this study show was an increase in online activity both in and out of the school setting. Students were engaged and took charge of their own learning. Choi and Piro (2009) state that, 'modern youth are connected to technology like no previous generation' (32). The teaching and learning landscape has changed and music educators need to stay abreast of developments in technologies and their use by students. Mark and Madura (2010) agree that music teachers need to question the relevance of 'their instruction to increasingly technological youth' (140). If this issue is not addressed, music education will become irrelevant, predated and due to its declining importance to policy makers be excluded from the curriculum. This study demonstrated that classroom teachers were enthusiastic about using blended learning in their

classroom, particularly with the mentoring they received. While results demonstrated that their skills and confidence levels increased as the year progressed, they expressed that seeing the engagement and progress of their students made it even more valuable.

There are many factors that require consideration so that societal expectations align with education. Dillon (2007) points out that the dearth of understanding that exists concerning creative and collaborative possibilities of the use of technology in music education affects 'the training of teachers, the design of music technologies and the development of meaningful music activities' (118). The music project was designed to provide a platform for relevant, meaningful and contemporary music activities that removed the classroom walls and brought the outside world into the classroom and vice versa. The musical activities were considered valued knowledge by the students and provided authentic opportunities for students to collaborate with professional composers, musicians, their peers, teachers and workshop music specialists. 'Great music education is a partnership between classroom teachers, specialist teachers, professional performers and a host of other organisations' (Department of Education 2011, 3). Dillon and Brown (2007) see such programmes as increasing 'access to authentic musical experiences'. Crow (2006) further explains that various free music technology applications used in current society by young people, such as *iTunes* or *Windows Media Player* can be regarded as a manifestation of collaborative possibilities, where students might make personal musical choices with regard to listening to music and can 'share their musical choices' (124). The final factor addressed in the project was that music specialist teachers had a support network and were offered professional developing. This was to help increase their skills and confidence in what was for some teachers an unfamiliar environment and change to pedagogy. The Department of Education in the United Kingdom stated:

> Technology is used most effectively when it supports a clearly defined musical outcome and adds intrinsic value to teaching and the creative process. The most appropriate use of technology is when music educators are clear about why they are using technology to teach musical skills, knowledge and understanding, and consequently which devices are most appropriate to use. (Department for Education 2011, 36)

This was similar thinking to the music teachers involved in this study.

Results indicated the significance of blended learning contexts when 98% of participating students completed all self-directed learning modules by the end of the year. A major factor in this was changing student expectations about music being 'school work' through participation and engagement with the project. There was a notable increase from the data captured at the beginning of the year when only 140 students or 32% said they think they would use the music project outside of school time, to half way through the year when the figures indicated that 300 students or 68% were actively using it outside of school time. This was further increased to 410 students or 93% by the conclusion of the year. This is not only supported by the steady increase in student interest and engagement (Figure 1), but the fact that many of the students decided to learn an instrument. Regardless of whether this correlation is statistically conclusive or not, it can be implied that there is a clear relationship. This is further supported by the music teachers who expressed that not only did they feel supported in using technology in an innovative and multidimensional way, but they could see the immediate value for their students' learning in the clear progress that was made. The students' qualitative comments confirm their engagement in learning music in an authentic and meaningful way.

The music project enabled students to build skills in using technology to support the development of for example music compositions, learning an instrument and participating in workshops. The success of the project was largely attributed to the platform that it provided for creating, sharing, collaborating and receiving feedback. It was a multidimensional learning environment that fosters metacognition as it is both student centred and self-directed. The opportunity for students to work with elite musicians and experience high quality music performances through partnerships with professional orchestras and bands has developed students' understanding of musical expression and inspired creativity. The benefits of such technology creating opportunities for enhancing quality music education experiences within real-life contexts supports current curricula objectives and the

thinking of contemporary society, particularly young people. The importance of such a platform for learning and teaching music education is further amplified by the requirements of the Australian Arts curriculum that offers music as one of the Arts from Foundation to Year 10 (ACARA 2015d).

It is encouraging that the use of technology in music education is widely recognised as having the potential to create exciting and engaging teaching and learning opportunities (Moore 1992; McCoy 2000; Byrne and Macdonald 2002; Ruthmann 2007). Mark and Madura (2010) state that 'technology will continue to evolve and music teachers will need to be prepared for a shifting paradigm for music education' (140). In fact, this pedagogical change will be true for education as a whole. New technologies have already created learning opportunities that challenge the traditional schooling model and pedagogy as barriers and restrictions on what, how and when people learn are removed (Collins and Halverson 2009). There has already been significant advances made in informal music learning spaces (Salavuo 2006, 2008; Partti and Karlsen 2010; Waldron 2013), and purely online platforms (Ruthmann and Hebert 2012; Pike and Shoemaker 2013; Tobias 2013). As pedagogy changes to meet the challenges of twenty-first-century education, blended learning will become a necessity in formal music education. This music project was an example of the positive learning and teaching outcomes that can occur when new technologies are embraced in an authentic and multidimensional way.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

Dr Renée Crawford is Senior Lecturer in the Faculty of Education at Monash University and a Research and Evaluation Consultant. Her diverse research includes the philosophy, impact and pedagogy of using technology in music education; holistic and authentic teaching and learning practice; blended learning; Music curriculum development; composition in the classroom; the impact of Arts and Music engagement in education from a sociological and intervention perspective; the role of the teaching artist in contemporary education. Renée had the privilege of managing and conducting research on high profile national research projects that responded to government agenda priorities. This work was done in collaboration with institutions such as The University of Melbourne, Victorian University, Australian Council of Education Research and Educational Transformations. The significant impacts of such projects has resulted in a deeper understanding about the importance of teacher led research and how the outcomes can change policy and practice. Her musical interests that continue to influence her teaching are in composition, film music, minimalism, the analysis of contemporary Australian music and the use of digital technology in music.

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