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# Investigating the Use of Digital Media in the Music Classroom with Experienced and Pre-Service Teachers

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## Investigating the Use of Digital Media in the Music Classroom with Experienced and Pre-Service Teachers

### Abstract

A Western Sydney research project investigated the question, “What are the practices of pre-service teachers and experienced teachers of music in secondary schools that successfully engage their students with digital media?” The hypothesis underlying the project was that digital media offers school students opportunities, and has the potential to allow more self-paced, interactive and personalized learning. Consequently, the research sub-questions were: (1) How are music teachers preparing students with the techniques and skills needed to take advantages of the opportunities that ICT offers? (2) How can music teachers develop their students' capacity to use and contribute to this wealth of information? The participants in the study were five experienced teachers and four pre-service teachers, and the method was a multi-site case study approach. Data collected in the project provided positive findings about growing student engagement with digital media in a range of Sydney schools. Pre-service teachers engaged with digital media for performance, critical listening, composing and providing instant feedback. Experienced teachers tended to limit social networking to older students (16-18-year olds). Both experienced and pre-service teachers used technology for assessment and reflected deeply on the ways digital media changed their pedagogy.

### Keywords

Digital Media, Exploratory Learning, Change in Pedagogy

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## Investigating the Use of Digital Media in the Music Classroom with Experienced and Pre-Service Teachers

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*A Western Sydney research project investigated the question, “What are the practices of pre-service teachers and experienced teachers of music in secondary schools that successfully engage their students with digital media?” The hypothesis underlying the project was that digital media offers school students opportunities, and has the potential to allow more self-paced, interactive and personalized learning. Consequently, the research sub-questions were: (1) How are music teachers preparing students with the techniques and skills needed to take advantages of the opportunities that ICT offers? (2) How can music teachers develop their students' capacity to use and contribute to this wealth of information? The participants in the study were five experienced teachers and four pre-service teachers, and the method was a multi-site case study approach. Data collected in the project provided positive findings about growing student engagement with digital media in a range of Sydney schools. Pre-service teachers engaged with digital media for performance, critical listening, composing and providing instant feedback. Experienced teachers tended to limit social networking to older students (16-18-year olds). Both experienced and pre-service teachers used technology for assessment and reflected deeply on the ways digital media changed their pedagogy. Keywords: Digital Media, Exploratory Learning, Change in Pedagogy*

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Across the globe, teachers and educators are challenged by the pace of new technologies and the changes they produce, or should produce, in how high school students engage with music. In the preparation of pre-service music teachers at Western Sydney University, digital media is used to give opportunities to explore different pedagogies with school students. When the pre-service teachers go into schools for their professional experience blocks, they encounter supervising teachers whose experience with digital media is variable. If those teachers have many years of experience in the classroom, their experience with digital media may have limitations and their usage be more constrained than those people they are supervising. Accordingly, this project set out to investigate the practices of a small group of pre-service teachers and a small group of experienced teachers.

This study has significance for global stakeholders as the need for music teachers to engage with flipped classrooms is not simply a local one (Bull & Kjellstrom, 2013). It is some years since Burnard (2007) pointed out that “music teachers . . . [as] flexible learning leaders need to be researching how effective teaching (and learning) happens in their own digital-rich music classrooms” (p. 38). Nevertheless, the use of digital media and ICT in the music classroom remains under-researched. Consequently, this small study addresses a gap by focusing on the techno-positive work of a small number of pre-service and experienced teachers. The intended audience are teachers.

In this project, the pre-service teachers were a group of four, two men and two women (with pseudonyms here as Jeff, Garry, Lacey and Kate), who had achieved excellent results in the curriculum method preparing their use of digital media for the high school classrooms, located in Greater Western Sydney, where there are pockets of disadvantage and affluence. The

five experienced teachers were recruited at occasions of professional learning—two men and three women (with pseudonyms here as Nathan, Alex, Shane, Tess and Stella). The two groups were separate as the experienced teachers were not the supervisors of the pre-service teachers; so the study is located in nine schools. It is a pilot study and intended to lead to a larger international study.

To provide a context for the impact of digital media on music teaching, this literature review addresses exploratory learning, teachers' feedback and the creation of digital stories using images and music software. It canvases the use of mobile devices and social learning networks. It also considers the possibilities of authentic learning and the role that media such as *YouTube* can play in musical learning. For teachers generally, the nub of the matter is change. Donnelly, McGarr and O'Reilly (2011) point out that any changes in the student learning experience ultimately reside with teachers. It seems that the adoption of practices associated with digital media and software usage depends on the values and beliefs of teachers about the importance of ICT and Digital Media for learning (Webb & Cox, 2004, cited in Schibeci et al., 2008, p. 314). In a study of 592 teachers in Singapore, Teo (2011) found teachers' perceptions of usefulness and ease of use were among factors that influenced teachers' adoption of practices. He also found that such teachers' perceptions are dynamic and do not remain static. His concern was that, if teachers did not continue professional learning, they could fall behind the pace of change with digital media and might begin to avoid technology usage.

### ***Exploratory Learning, Digital Stories and Feedback***

In research conducted in UK schools (InterActive Project conducted by Sutherland et al., 2004), one focus area was music and involved six teacher participants. The teachers were described as techno-positive. The researchers noted that music students frequently came to class with knowledge of styles of music that could exceed their teachers' knowledge in particular areas. The students had some familiarity with music software packages that enabled them to compose within contemporary styles of music that were important in their social and cultural lives. The researchers characterised the learning as "exploratory" and went on to comment that *some* teachers "recognised the benefits of this exploratory style of learning in music and viewed the classroom situations as opportunities for them to learn from the students rather than vice versa" (Sutherland et al., 2004, p. 417). Significantly, the researchers suggested that it may be important for young people to be able to "work with both digital and non-digital tools . . . and be actively engaged in discussion of the relative merits of different tools" (ibid., 423-424). Such discussions are opportunities to develop critical thinking.

Yang and Wu (2012) went further and looked at technology-supported approaches to enhance learning. They found that Digital Story Telling (DST), by taking advantage of advancements in technology and instructional design, had the potential to become a transformative pedagogy, meeting goals for subject matter content acquisition, critical thinking skills, motivation, and information literacy. DST has been defined (Ohler, 2008) as the art of oral storytelling combined with new technologies using images, graphics, music, and the author's own voice. For teachers, DST projects had the potential to pose problems that are deeply connected with the course content. For students, they provided opportunities to think critically and to have control of the learning process.

Flipped classrooms (Bull & Kjellstrom, 2013) have demonstrated that, when teachers provide instruction that can be accessed before and after the lesson, the lesson itself can be used for student work and the provision of formative evaluation by the teacher. When teachers are techno-positive, they tend to provide feedback on tasks through digital media. Ruthman (2008) evaluated teacher feedback and advocated for "the freedom for students to express their

intentionality during composing experiences” in order to manage the “tightrope we walk as music teachers in our efforts to facilitate students’ creativity” (p. 56). Such feedback in the older years of high school can be related to technical learning, group performances and ability to share comments on other students’ learning (Yang & Wu, 2012). In observing school practices with new technologies, there is evidence that older students in schools are exposed to a wider variety of experiences. In a survey of 180 schools in the UK, Savage (2010) found that there was an increase in ICT usage in Year 10 onwards, a fact that seems to indicate teachers being prepared to engage with students when they reach that level.

### ***Mobile Devices and Social Learning Networks***

Salavuo (2008) maintained that social networking platforms challenge music education to acknowledge that students can and do develop skills and knowledge in formal classroom and informal network settings. His argument is contextualised in higher education, but he advocates learning from environments that have been constructed to function on an informal basis and open the “fences surrounding educational institutions” (p. 131). The challenge for high schools is to monitor the safety of sites for adolescents still at vulnerable ages. It seems that concerns about safety can mask teacher scepticism about the positive applications of mobile technologies.

Personal mobile devices and social learning networks move learning beyond the physical classroom and extend access of information sharing with other students (Chan, 2010; Dede & Richards, 2012; Wong, 2012). Zhang and colleagues (2011) present seven constructivist principles suited to a learning environment that moves beyond the classroom: use the possibilities of mobile technologies; integrate formal and informal learning activities supported by mobile technologies; design learner-centred learning activities; make use of community support and resources; facilitate collaborative knowledge building; support teachers to become curriculum developers and facilitators; and formatively assess learning (Zhang et al., 2011).

### ***Authenticity and YouTube***

Digital media can appeal to the layers of the brain (reptilian, limbic, and neocortex) that sense the nature of sounds, react to scenes and music emotionally, and appreciate it intellectually (Berk, 2009, p. 4). Such stimulus suggests authentic problem-solving work can be facilitated by technology (Ertmer & Ottenbreit-Leftwich, 2012). Furthermore, musical problem solving can be enhanced with access to media such as *YouTube*, (Krauskopf, Zah, & Hesse, 2012) enabling youth to see performances that may otherwise be unavailable to them and facilitating the sharing of their own performances when they upload them. Peppler and Kafai (2007) suggested that youth are not only consuming new media at accelerated rates (Rideout, Roberts, & Foehr, 2005), but they are also producers for digital media in larger numbers, with participation in *MySpace*, *YouTube* and other sites being indicators of current trends. Partti and Karlsen (2010) go further and suggest that digital media is integrally connected with how youth construct and maintain their self-identity (p. 370). They believe that “the challenge for students is to find a way of navigating between their global and local realities, bridging the gap between them and experiencing them as a holistic continuum instead of as an incommensurable dichotomy” (p. 377). For this reason, this pilot study focuses on pre-service teachers and experienced teachers who are creative in their application of technology tools to new pedagogies.

Before moving to discuss method, I will place myself in the picture. I am a music academic at a university which prepares pre-service teachers. The four pre-service teachers had

previously completed units of study with me but were not currently studying with me as they had progressed to professional practice blocks in schools. The five experienced teachers were participants at professional learning events run by the Australian Society for Music Education and the Orff Schulwerk Association, and I am a member in both professional associations. My interest in this topic has grown from my awareness of the varied picture of the use of digital media I see when visiting schools. I wanted to draw upon the experiences of teachers and pre-service teachers who are techno-positive in order to show what could be achieved when technology tools are embraced for musical purposes.

### **Method**

This project adopted a case study approach because that allows for a deep investigation of a person, group, issue or phenomenon within the unique boundary of their context (Creswell, 2007 & 2014). Moreover, case studies enable exploration of the research problem within the context of those involved. When a specific example is scrutinised, it shines a light on the formulation of a “more general principle” (Cohen, Manion & Morrison, 2000, p. 181). The limitations of case studies are their bounded context, but the richness of case study data may assist in understanding other examples (Cohen, Manion & Morrison, 2000; Creswell, 2007; Stake, 2000). In this study, a case study choice allowed rich description of events for analysis in specific school sites, with specific teacher practices, in order to answer the research question.

The pre-service teacher participants had outstanding results in the previous year. From a class of 24 music pre-service teachers, four results stood out and these pre-service teachers were purposefully recruited. The teacher participants were recruited by invitations on a notice board at two professional learning events. The project took up the assumption that teachers who attended professional learning were engaged and open to new knowledge. Ethics processes were completed at Western Sydney University. Participants gave their free and informed consent, were assigned pseudonyms and were invited to answer interview questions. The approach relied on open-ended questions that move beyond simple description and try to explain perspectives (O’Leary, 2004). Pre-service teachers gathered in a focus group in a university meeting room after they completed their final professional practice block. The interviews for experienced teachers were separate in their schools and, at their request, after hours.

The project used a focus group as more suitable than individual interviews with the pre-service teacher participants so that they could explore ideas collectively to build rich accounts of their experiences with teaching music using digital media. The dynamic and interactive nature of focus groups is productive in qualitative research and is widely considered in social research to be more appropriate than one on one interviews (Barbour, 2007). The project used interviews with experienced teachers as they were in different school sites. The teachers member-checked their own transcripts of interview to assure accuracy. Data in the study consisted of the responses to questions, shown in Appendix A. These responses were reflections on practice from the participants. Reflection can build a layer of meta-practice, especially critical self-reflection, so that the experienced and pre-service teachers come to know how they have related to their context (Rendon, 2009).

The project used thematic discourse analysis (Jorgensen & Phillips, 2002) to provide a nuanced account of themes articulated in the interview data. Flood (2010) adds that response data is not only observational but also “reflective” (p. 11). Coding followed the transcription of interviews, using memoing (Miles & Huberman, 1994) to write up ideas and tie together different pieces of data. An example of memoing follows:

What are people learning about their practice? About when technology tools work and when they do not? About decisions teachers make? It suggests the way people learn about the world; but the participants bring assumptions to their learning, from their own values. This learning depends on openness and the reciprocal nature is part of the openness.

For both pre-service and experienced teachers, the questions were about: designing experiences with junior and senior years in high school; preparing classes to use digital media and ICT; preparing students for future workplaces and “real world” experiences; accommodating new pedagogies and ways of knowing; and changing the place where learning occurs.

Later came the step of describing commonalities and recurring patterns. For example, all the learning experiences provided for Years 7-10 that was contingent on available resources were grouped. Comments on teacher preparation for experiences for Year 7-10 were grouped. Reflections on teacher preparation for senior years were grouped. Comments about preparing students for real world experiences were grouped. This “real world” section highlights changes in pedagogy and extending the place where learning occurs. Table 1 below shows this process for each of four emergent concepts. Coding requires that authors acknowledge their researchers’ analytic lens. Preservice education programs are designed to prepare teachers who will work in diverse classrooms. Consequently, there is an assumption that preservice teachers, placed in a new context, can manage their learning environment while they have a qualitatively different experience of teaching. This assumption, also applying for teachers, underpins interpretations of data. The coding practice follows Saldaña (2016), who advocates that qualitative codes, developed by researchers, are essence-capturing and actively facilitate the analysis of connections among the data.

*Table 1: Demonstrating Development of Concepts*

Concept	Evidence of quality	Sample quote
Available resources	Schools are differently resourced, depending on school budgets	Using i-pads . . . because that allowed us to do simple classroom arrangements. Without mallets, I think students miss out on learning any kind of technique. But it did give them instant feedback on being able to read the music (Jeff).
Preparing classes to use digital media and ICT in junior high school	Practices in which teachers engaged to prepare students: just in time teaching; modelling . . .	They had to compose an 80s piano riff, after listening to examples in class. They heard their work back on <i>Note Flight</i> but didn’t really like the sound of a MIDI piano. When I taught them to export the file into <i>Garage Band</i> , they had a blast, playing with the range of synthesiser sounds (Alex).

Preparing classes to use digital media in senior high school	More in-depth practices and more independent learning.	With Year 11-12 score annotation, I begin: "Look at the score. What don't you know?" That's helped them focus . . . when they listen with the score, I feel like it opens the door as they can see what's going on as well as hearing it. My Year 12s scan their work and send it to me, and I give feedback on that (Nathan).
Preparing students for real world experiences, highlighting change in pedagogy and extending the place of learning	Preparing students for independent tasks.	They're far more likely to record themselves on their home computer than they are to pay someone to do it in a studio. Being able to record your band is important, as is being able to mix a band and see how that works digitally. It demystifies it (Garry).

In the first sample quote, the available resources led the pre-service teacher to teach the lesson in a different way than he might have done. He adapted to the situation and his flexible approach is typical of the adjustments other pre-service and experienced teachers also make. In the second sample quote, the experienced teacher uses just-in-time teaching when instructing about exporting a file to another software base. Pre-service teachers also used this approach. The third sample quote about score observation shows the experienced teacher drawing out musical knowledge from the students rather than providing information that they already knew. It shows a focus on deep knowledge and independent learning. In the fourth sample quote, the pre-service teacher discussed with the students what their future practice as a band musician is likely to be and sets them up for success in that.

### Findings in Junior High School Years

#### *Designing Experiences with Available Resources*

With junior high school students in Year 7 (13 years old), the pre-service teachers used digital media in a range of ways. Some were simple decisions based on available resources. Jeff used *I-pad* xylophone apps with the non-melodic percussion in the classroom. He worked like this because the school did not have a class set of Orff barred instruments. Here was an example of using digital and non-digital sources (Sutherland et al., 2004). He used the school's class set of *I-pads* as they were available.

It depended very much what available resources and digital media the school had as to the ways the pre-service teachers found to apply ICT. In one school, an Interactive White Board (SMART) was in the music room and Kate used that to demonstrate websites where students could access sounds and video on their laptops. Working on a unit of hip hop with Year 7 and guitar with Year 8, she encouraged the students to



. . . access sound files where they could combine different layers into their own mp3 files. I'd demonstrate on the SMART board how to work with the file and then they'd create their own musical piece. I'd give them a small task to do at home and they would progressively work on their pieces at home and at school. I'd have images of chords on the SMART Board as well.

In similar ways, the experienced teachers had a range of uses of digital media. Shane had Year 7 students doing internet searches on musical topics and blogging about them, as well as composing simple melodies. Another teacher, Tess, stated that the Year 8 class composed a one-minute piece of music for a cartoon clip using *Finale Notepad*. Stella encouraged students to use apps to source rhythmic riff patterns from favourite songs from *YouTube* and add instrumental rhythmic or melodic riffs, layering sounds over the original track like a "pastiche effect."

In summary, both experienced and pre-service teachers committed to making the available resources, including digital ones, work for the students and enable improved outcomes for them. They supported the students' skill development with accessing sound files and combining layers. They encouraged the students' musical literacy and enjoyed the students' creative work and their critical evaluation of sound.

### ***Preparing Classes to Use Digital Media and ICT in Junior Years***

In every situation, the pre-service teachers used "just in time" teaching about digital media. For instance, Lacey found that, if the lesson was to incorporate *Garage Band* and the students had not used the program before, "you can just get them on it, and they will pick it up in no time." Garry's approach was to scaffold learning by using digital media for the purpose. He knew that his work with Year 8 on *Garage Band* was the most complicated use of digital media they had yet encountered:

I did a preparation lesson where I demonstrated on my computer linked to the screen. I'd get them to tell me what they knew as I demonstrated. In the next lesson, with the students on the computers, I'd created little 3-minute instructional videos about using the software. There was everything from how to open the program to how to make a loop. I had a list of the different tutorials and the students could choose what they needed, or revisit one. I would go around and assist them and might suggest to them to look at a particular tutorial. That made it easy to get around to all the kids. They had the scaffolding there. It was a boys' school and they all thought they were pretty good with technology. None of them were afraid of it.

Nathan, from an experienced teacher's perspective, gave more detail about his approach in planning, allowing students to work at their own pace:

Before going into the classroom, I plan how it's going to work. I really like to instruct from the front first. If any questions come up, I answer those. My planning also includes ways students can see instruction when they need it, like a video of instruction on my blog. I show them what to do first and then ensure they have the resources to complete in their own time.

With an experienced teacher's practicality, he also explained why he did not use some types of digital media with young adolescents:

I don't use *Edmodo* with Year 7s. I keep that for later years. I'm not convinced that Year 7 can cope with that kind of social networking. I do teach 75 of them so it could get a bit much.

Unlike Nathan, Alex, another experienced teacher, encouraged all his students to learn beyond the classroom by posting on *Edmodo* and he called for students to upload their own *Garage Band* compositions from time to time. About digital story, he confirmed that ICT based compositions used *Garage Band*. For example, there was an assessment task based on an Aboriginal Dreamtime story, where students created a soundscape to accompany the story.

Experienced teacher Stella saw the benefits and drawbacks of digital media through a lens of quality.

The benefits of accessing on-line digital media help promote learning sensations for novice, intermediate and advanced learners. They can easily access experiences through *YouTube* clips, graphic notations and recordings, tabs and interactive freeware. The disadvantages are problems with the net, poor recordings when the clips are very compressed and the lack of clear sounds of instruments can be a problem for aural identification. It is important to critically evaluate sites.

In summary, preparation, whether by pre-service or experienced teachers gave students the opportunity to see how their work could progress and how their queries could be addressed without delay. Modelling was a key strategy as was the preparation of short instructional videos that students could access as needed.

### **Findings in Senior High School Years**

#### ***Preparing Classes to Use Digital Media and ICT in Senior Years***

Kate noticed the way that, with Year 11, independent work happened whether she was using the digital media to encourage good performance practice or to stimulate their composition.

With Year 11, I created email addresses for all and would send files they might use as they worked independently on composition. In class, we would look at challenges, such as parts for transposing instruments. It depended on where they were at. I'd cut down the task for them if that made it achievable.

With his Year 10 class, Jeff did a unit on Rock music, where he demonstrated powerfully what changes in pedagogy digital media enables. He was able to model ensemble parts he wanted the students to play and be simultaneously present to different student musicians with different instrumental roles. Moreover, digital media provided the tool for the performance assessment.

We looked at guitar effects. In playing a Led Zeppelin song, I found drum parts with a musician demonstrating, and the other parts I videoed myself playing, and I put them all on a server for student use. So they would sit there with headphones and the I-pads, learning how to play their part with the videos I'd provided. Then I got them to video themselves and upload that back up to the server. That formed their assessment, the video that they did.

All four pre-service teachers had the goal of providing a foundation for students who needed that and simultaneously allowing students with more skills to continue their creative response. Jeff reflected on a discussion he had with a supervising teacher:

They get a head-start in making something. They get immediate access to the “fun bit.” They become engaged and if their decision is to continue, then they can learn the tools they need to sustain their creativity. My supervising teacher said to me, when the students were choosing loops in *Garage Band*, “It’s not really composition.” But I think they are making musical decisions, experiencing the things you do if you were composing. The possibility is that students may not go further and put in the hard work to be innovative. Some will be quite happy to manipulate the loops that a software designer has provided. However, some of the older students had progressed a long way from this early stage.

In the senior years of high school, as students developed expertise, pre-service teachers noticed the use of different software and a deeper level of exposure to new technologies with a greater emphasis on working independently. To provide opportunities for Year 12 to enhance their aural skills, Jeff used different software:

I used software, called *Capo*, that can slow down the music and you can isolate a segment of music. The students found that very useful to identify musical features. One song we looked at had an envelope filter on the bass guitar. It was double tracked in the version I had, one with straight bass guitar and one with the effect on it. I was able to play the two of them separately to show the tone colour changed. I’d say, “Here in this section, listen . . .” and they’d say “Oh, yes.” It was practice that made the development of aural skills achievable.

Digital media enabled students’ exploration of structure in simple ways. The pre-service teachers tried strategies such as cutting out the chorus of a song and then making a double chorus by dragging and dropping it. They invited students to design their own form for a song, then discuss the outcome and see whether they preferred one version over another. All four pre-service teachers knew that using digital media can have problems. These can arise from technology itself, from student distractions or from more traditional practices of supervising teachers. Garry discussed a lesson that was not able to reach its goal and where he had to adapt from use of digital media to an acoustic solution. His accompaniment templates for a jazz melody, were put on the school server for students to download them but problems came with accessing those when the server went down. So he improvised drum accompaniments for the melodies.

Pre-service teachers found that, where students had to double up students on terminals, the “weaker students might distract each other.” They accepted this as a challenge to monitoring students’ engagement. They also recognized that their supervising teachers frequently were wary of using mobile phones and of student access to public sites. Garry wanted to be innovative with getting students to access social media websites on their phones, but he accepted the supervising teacher’s decision. However, he indicated he might still try it out in a different school setting:

In my first professional experience school, I had an idea that I ran past my supervising teacher, to set up a *Facebook* page for the school and then have all

listening activities there. That would get the Year 7 kids familiar with the genres they were listening to in class. But she thought it would be too hard. I could probably try that in the school where I am now.

Experienced teachers accessed programs to support the learning of particular skills for students. Stella commented that older students utilised online teaching tutorials on *YouTube* for learning guitar or piano pieces or accessing charts for drums. She helped Year 11 and 12 find online theory courses.

In summary, both pre-service and experienced teachers did not expect all the class to be advancing at the same pace. They made work achievable. They used digital media for performance assessment, with students sending them files, and for development of aural skills and critical listening. Pre-service teachers learned about monitoring for off-task behaviour and to accommodate the policy of schools in which they were not employed regarding mobile phones and social media websites.

### ***Preparing Students for Future Workplaces and “Real World” Experiences***

With composition, they all felt that being able to hear music back instantly helps the student. They understood the advantages in students’ learning to hear what they wrote but they also had formed the view that there was time for students to develop that skill. Jeff put it neatly: “I’d never hide from students that the ultimate goal was being able to develop inner hearing of their own composed music.” However, they felt constrained by the digital media available in schools. Lacey was forthright about this and suggested that she would see her role more in the development of a composer identity:

Most of the kids see themselves as performers and I think this may be the impact of the limited resources. If I use *Finale*, I want to explain: “This is a program real-life composers use.” I want students to know they’re learning a program not because a teacher makes a decision but because it’s useful. One lesson plan I prepared is to get kids to compose a piece, explain the process of composing and describe themselves as a composer. This is the beginning of taking on that identity and marketing your skills. That’s what musicians do. That’s how they get hired, getting known through the internet. That’s a life skill to learn early.

Garry, who had previously had significant music industry experience, discussed using an external stimulus, such as a competition, as providing authentic experience in both composing and recording:

If you incorporated this into the curriculum, the kids would get more exposure to recording. They’re not only learning how to apply what they learn, they’re getting real world experience.

Among the experienced teachers, Nathan discussed applications of learning:

I think recording is a major benefit. I include multi tracking, making a video and mixing as well as lighting (in another course). They learn so much. When we had a guest performer, the students were able to do the lighting and operate the sound desk. When you’ve got knowledgeable facilitators in charge, those experiences are so beneficial.

He also discussed the accessibility that digital media provided and the choices that it offered students to plan and complete work at a time that suits them. He reminded students “you can do this when you want. I just need it by this date.”

With Years 10, 11 and 12 Nathan and Shane both used the digital experience to extend the classroom conversation. Their motivation was to share resources, critique performances and generally unpack at the end of a lesson. Stella added, talking about external workshops on DJing:

The students tend to self-facilitate if they see a motivation to learn skills like these. They begin to understand how their experiences blend and contribute to who they are as a musician and what they can achieve.

There are indications that teachers like Nathan had changed the way they taught

I think information isn't so much about what you know as about how you can get to it and how you can apply the knowledge that you've learned. When I began teaching, I wrote notes on the board. When I reflected on that, I thought why am I doing this? The students are quiet but they're not learning. I never do that anymore. Now my approach is: “I'll send this worksheet online. You can use that later when you're revising for a test.” I think it has really changed how we teach. I think it's changed the way we learn.

In a similar vein, Alex spoke about the positives of students being connected to each other in an online environment in the pursuit of knowledge. Furthermore, he saw a shift in teaching practices from simply acquiring knowledge to understanding:

The benefit is that technology now is at a stage where, used correctly, it can facilitate authentic learning opportunities. Using Web 2.0 for example, students can share ideas and collaborate in different ways. I have seen that students can be more engaged, organized and motivated to participate using Web 2.0 technology. The “search and find” option shifts the focus away from education to gain knowledge, and moves to understanding how to use, manipulate and create based on this knowledge. I think this alters cognition, and hence has changed the way we teach. I know I can assign a video to my class that explains a topic and use class time to apply this to new situations, testing how much they actually understand this knowledge. Again, the use of mobile devices means that knowledge acquisition should not really be our end goal. Instead, we should be developing an understanding of this knowledge. Communication occurs on multiple levels in a blended learning environment.

In summary, pre-service teachers wanted students to know about marketing their music skills. They wanted to demystify the process of recording themselves. They wanted them to apply what they learned in events like competitions. Experienced teachers discussed the varied skills that students learn and how they can apply them within school settings. They also discussed students working in their own time and the sharing of ideas that Web 2.0 facilitates.

### ***Discussion: Change in Pedagogy***

The pre-service teachers had limited experience of different schools. Nevertheless, Garry observed different resources affecting pedagogy from one block professional practice to

the next. He reflected that, in his final professional practice block, he had seen the students being taught to use *Sibelius* in Year 7, with a desk-top available for every student in the computer lab. He observed the students collaborate using the software on creating a melody. He noticed that was quite different from his first school experience. This confirms previous research that, by providing an immediate compositional product, the teachable moment lies in the refinement that could be brought to a musical piece, in the musical decisions that students can discover. This also exemplified the pre-service teachers' keen observation of the resourcing of the schools in which they would practise their teaching for four weeks, with the anticipation that, in the future they would have input to resourcing decisions.

In general, the pre-service and experienced teachers wanted to link the class experience to the world beyond the classroom. They found that they could be imaginative and try different composition approaches. Accessing digital media to use loops to create an alternate sound track to a film excerpt prepares students for digital story (Yang & Wu, 2012), for uploading files to contribute to knowledge and for the creation of their own profiles in social networks (Partti and Karlsen, 2010). Both pre-service and experienced teachers used *YouTube* clips to focus on analyzing concepts in musical examples, appreciating music intellectually (as in Berk, 2009). Using the school intranet to upload assignments for students to see each other's work and learn from that aligns with research on web-based learning networks (Chan, 2010; Dede & Richards, 2012). Both experienced and pre-service teachers tended to see the connection between online networks and the construction of a musician identity (aligned with Partti & Karlsen, 2010).

This pilot study has researched the practices of a small group of teachers and pre-service teachers to take account of the different possibilities with students commencing their high school years and senior high school students. The pre-service teachers were those who had outstanding results in their own studies and the teachers were those who attended professional learning. The study relied on their accurate reflections of how they taught. Consequently, this is not intended to be generalizable. It is intended rather to reflect on the practices of a group of pre-service and experienced teachers. They provided positive results about student engagement and about changing teacher practices with digital media in a selection of schools in Sydney. There is the opportunity for other investigators to build on this research. In an economic climate where school budgets are stretched, the study shows the benefits pre-service and experienced teachers found for student outcomes and provides evidence of student success in musical problem solving.

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### **Appendix A: Questions for pre-service teachers and experienced teachers**

1. What sort of experiences do you present to Year 7 students, using digital media? Are subsequent high school years offered the same or more complex experiences?
2. How do you prepare high school students to take advantage of the opportunities that ICT has to offer?
3. In what ways do you use digital media in conjunction with musical composition?
4. In what ways do you use digital media in conjunction with critical listening?
5. Do you see yourself as preparing students for workplaces that might use digital media and music?
6. In what ways do you consciously engage students in authentic learning experiences that they might undertake in “the real world”?
7. What are the benefits and costs of students learning through technology?
8. Does the “search and find” mentality alter cognition? Does it change the way we teach in the classroom?
9. To what extent does the ubiquitous mobile phone transform understanding of the classroom as the *place* of learning?
10. How can you use social networks beyond the classroom for purposes of learning?

### **Author Note**

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